



# UNITED STATES ARMED FORCES MEDICAL JOURNAL

*Published Monthly by  
the Armed Forces Medical Publication Agency  
Department of Defense*



*Editor*

CAPTAIN BENNETT F AVERY, MC, USN

*Associate Editors*

COLONEL ROBERT S ANDERSON, MC, USA  
LIEUTENANT COLONEL PAUL V DAVIS, USAF (MC)

*Assistant Editor*

LIEUTENANT FRANKLIN M ROBERTS, MC, USNR

UNITED STATES  
GOVERNMENT PRINTING OFFICE  
WASHINGTON 1957





# Table of Contents

1949

Transient Atrial Fibrillation: A Frequent Occurrence in Apparently Normal Hearts— <i>Robert V. Carter</i> .....	11
Trends in the Management of Pulmonary Tuberculosis— <i>John A. Thomas and James L. Jones</i> .....	11
Pleurisy With Effusion Due to Remote Trauma: A Differential Diagnosis for Acute Idiopathic Pleural Effusion— <i>George Eugene L. Evans, Charles B. Shiner, Jr. and Timothy V. Carter</i> .....	12
A Panoramic X-ray Dental Machine— <i>Donald C. Jones and John W. Hamaker, and George Dickson</i> .....	12
Technic of Cremaster Muscle Dissection in Inguinal Hernioplasty— <i>Frederic F. Bannister</i> .....	12
The Passive-Aggressive Personality— <i>Charles L. Frager and Christopher L. Shere</i> .....	12
CLINICOPATHOLOGIC CONFERENCE	
Brooke Army Hospital, Fort Sam Houston, Tex. ....	13
SERVICE ARTICLES	
Dependents Medical Care Act— <i>Paul I. Robinson</i> .....	14
The Functions of the Naval Neuropsychiatric Treatment Center— <i>John F. McMillan</i> .....	14
Entomologic Illustration At the 406th Medical General Laboratory— <i>Hugh L. Aegerter</i> .....	15
CASE REPORTS	
Sickle Cell Hemoglobin C Disease: With Splenic Infarction Following High Altitude Ascent— <i>James M. Sweeney, Lemuel I. Craven, John F. Christensen and Lane B. Cooke, Jr.</i> .....	15
Fatty Liver and Fat Embolism— <i>Eugene J. Farrell and Benjamin H. Sullivan, Jr.</i> .....	15
Epidural Intracranial Abscess— <i>Robert E. Kenna and Thomas A. Longmire</i> .....	16
Tietze's Syndrome— <i>Reynolds E. Klages, Jr.</i> .....	16
DEPARTMENTS	
A Message From the A. M. A. ....	17
Committee on Nutrition Visits Europe and Middle East.....	17
Deaths.....	17
Medical Personnel Given Awards at Military Surgeons Meeting.....	17
BOOKS	
Reviews of Recent Books.....	18
New Books Received.....	18



# UNITED STATES ARMED FORCES MEDICAL JOURNAL

---

Volume VIII

January 1957

Number 1

---

## TRANSIENT ATRIAL FIBRILLATION

A Frequent Occurrence in Apparently Normal Hearts

ROBERT A. CLASS Major USAF (MC)

**T**HE OCCURRENCE of atrial fibrillation in seemingly healthy persons presents many interesting problems in determining its cause and treatment. In most instances, any sizable number of individuals with atrial fibrillation can be separated without difficulty into two significantly dissimilar clinical groups—a large group with diseased hearts and a small group with anatomically normal hearts. Although it is now well known that atrial fibrillation, particularly the paroxysmal form, may occur in persons who show no other evidence of organic heart disease, the frequency with which this arrhythmia is observed in the selected and comparatively healthy military population is not generally realized.

Over 40 years ago Gossage and Broxton Hicks<sup>1</sup> focused attention upon the occurrence of atrial fibrillation in normal hearts when they reported the case of a young man who developed fibrillation with otherwise normal cardiac findings and who died 19 months later. Nearly two decades later Parkinson and Campbell<sup>2</sup> reported that 15 per cent of 200 patients with paroxysmal atrial fibrillation showed no signs of cardiac disease. Since then those familiar with this arrhythmia<sup>3-7</sup> have agreed that approximately 5 to 6 per cent of all atrial fibrillation occurs in normal hearts, the arrhythmia being transient or paroxysmal in about two thirds of the cases and established in the remainder.

---

From Clinical Medicine Branch, Professional Services Division, Office of the Surgeon, Headquarters, United States Air Forces in Europe, APO 633 New York 6, N. Y. Dr. Class is now at the Tucson Clinic, 116 North Tucson Blvd., Tucson, Ariz.

## MATERIAL AND METHODS

Sixteen cases of transient atrial fibrillation were observed during a 30 month period in military personnel stationed within an overseas command. All individuals were men on active duty with United States military forces in Europe or North Africa during the period of observation. I cared for or saw in consultation one half of the group. The remaining eight cases were obtained from a review of medical records. Each patient was examined during one or more episodes of atrial fibrillation and the diagnosis confirmed by electrocardiographic tracings. In every case a careful evaluation was conducted in order to rule out organic diseases such as rheumatic fever or hypertension as possible causes. Roentgenograms of the chest with or without cardiac fluoroscopy were obtained in each case. Laboratory studies including hemoglobin, red blood cell count, total white blood cell and differential count, urinalysis and cardiopulmonary tests were normal in all instances. In cases where hypothyroidism was suspected, basal metabolism and protein bound iodine determinations were performed with normal results. In a few other cases, a Master two step test was accomplished to evaluate the possibility of coronary artery disease.

## CASE REPORTS

Table 1 summarizes the findings in cases not discussed in detail. Only one person was over 35 years of age when the attacks began. The age at onset in five patients was 21 years or younger. Four selected case reports emphasize specific features of this condition.

**Case 1.** A 21 year old airman was admitted to the hospital complaining that "my heart is falling out of joint." Further questioning elicited a 15 year history of a sudden recurrent oppressive and aching precordial pain associated with palpitation and followed shortly by dyspnea. These attacks which had begun at six years of age were noted to be precipitated most often by physical exertion or emotional tension and excitement. They occurred at intervals from a few days to six months and were usually of a few minutes duration but one previous episode had lasted for 30 hours. During his military service the patient had been hospitalized twice previously with these attacks but they subsided without specific therapy. On both occasions the precipitating factor was emotional tension associated with a fist fight while under the influence of alcohol.

On the present occasion he had experienced a sudden onset of precordial discomfort, palpitation and dyspnea immediately following an argument. Examination revealed a hyperkinetic, excited young man with a blood pressure of 128-116 mm Hg (systolic) and 76-66 mm Hg (diastolic). The apical rate was 128 per minute and the radial pulse 120 per minute. A total irregularity of rhythm and force of cardiac systole was

observed without other abnormal cardiac findings. The remainder of the examination was not remarkable. An electrocardiogram on admission revealed atrial fibrillation without other abnormalities. He was given 0.10 gram of Seconal (brand of secobarbital sodium) and placed on bed rest, and the rhythm returned to normal 30 minutes later. A repeat electrocardiogram was interpreted as entirely normal. Basal metabolism determination was plus 4. He was returned to duty three days later with the reassurance that he did not have cardiac disease and with the advice that he avoid fights and other emotional upsets.

He was followed as an outpatient and two months later he experienced paroxysmal palpitation for a few minutes following an argument with his supervisor. One month thereafter he again experienced an episode of marked cardiac irregularity immediately after becoming excited. This subsided after 20 minutes and as usual necessitated no specific treatment.

**Case 2** A 34 year old airman was hospitalized with complaints of palpitation, nausea and vomiting for one day prior to admission while drinking excessively. During the preceding year the patient had noted transient episodes of palpitation occurring mostly at night together with mild dyspnea and sharp fleeting precordial pain unrelated to effort. He was known to be a very heavy drinker and smoked an average of 50 cigarettes per day.

At the time of admission the patient appeared acutely ill with a temperature of 98.6°F and a blood pressure of 130/85 mm Hg. His pulse was grossly irregular at 128 per minute, and respirations were 24 per minute. Examination was otherwise unremarkable except for a cardiac rate of 140 to 150 per minute with a grossly irregular rhythm. An initial electrocardiogram revealed atrial fibrillation of 110 to 160 per minute with no evidence of myocardial damage. Because of the severity of symptoms he was rapidly digitalized intravenously and eight hours later was asymptomatic but the fibrillation still persisted at 80 per minute. He was maintained on oral doses of digitalis for the next six days but the fibrillation continued with a slow ventricular rate. He was then given quinidine orally which established a normal sinus rhythm. All laboratory investigations, including cardiac fluoroscopy and basal metabolic rate, revealed no evidence of organic heart disease.

Quinidine was gradually decreased over a 10-day period, following which he was discharged asymptomatic without medication and was advised to avoid tobacco and alcohol. One month later he complained of mild palpitation. Fibrillation had returned at a rate of 130 per minute. He had resumed smoking and drinking in the interim. The arrhythmia was converted to sinus mechanism after 12 grams of quinidine given orally. Again quinidine was gradually decreased, and on return to the United States six weeks later he was asymptomatic without therapy.

**Comment** These cases illustrate the importance of emotional tension and acute alcoholism as precipitating factors and point

TABLE 1 Data on cases of transient atrial fibrillation

Case number	Age at onset	Age when first examined	Number of attacks	Duration of attacks	Possible precipitating factors	Treatment	Follow-up data
5	20	20	Several	5 min to 12 hr	Acute alcoholism and exercise	Phenobarbital	No recurrence during 6-mo period
6	32	32	1	Few hours	Heavy smoker	Quinidine abolished episode	No recurrence in 4 mo
7	34	36	3 or 4	1 to 6 hr	Alcohol heavy meals nervous tension smoked 2 to 3 packs cigarettes daily	Episodes ceased spontaneously	Unavailable
8	21	21	1	14 hr	Physical exertion	Cedilanid intravenously abolished episode	No recurrence in 2 mo
9	48	48	Several	1 to 2 hr	Smoked 2 packs cigarettes daily	Episodes ceased spontaneously	Asymptomatic recurrence noted on annual physical examination 16 mo later
10	26	29	Several	Few hours to 7 days	Upper respiratory infection and airplane flight	Quinidine abolished episode	Recurrence 6 wk after original attack Returned to duty on maintenance quinidine

TABLE 1 Data on cases of transient atrial fibrillation — Continued

Case number	Age at onset	Age when first examined	Number of attacks	Duration of attacks	Possible precipitating factors	Treatment	Follow-up data
11	28	28	1	Few hours	Influenza immunization heavy drinker (epilepsy?)	Episodes ceased spontaneously	Normal examination 4 mo later
12	17	19	Innumerable	5 min to 3 hr	Usually with emotional upsets	Episodes ceased spontaneously	Transient paroxysms continue but are not incapacitating
13	33	35	Several	Few min to 5 days	Excitation fatigue nervous tension	Episodes ceased spontaneously or with quinidine	Attacks continued over 18-mo period at intervals from weeks to several months with no suppressive quinidine therapy
14	23	23	1	Several hours	None	Quinidine abolished episode	No recurrence in 6 mo
15	20	20	1	30 hrs	Acute alcoholism	Quinidine abolished episode	No recurrence in 6 wk
16	27	27	1	3 days	Nervous tension and anxiety	Digitalis plus quinidine abolished episode	No recurrence in 3 mo

\*Cases 1 through 4 are discussed in detail under "Case Reports."



out the variability in frequency and duration of attacks. The repeated spontaneous termination of attacks in the first patient is contrasted with the longer duration of attacks requiring specific therapy in the second.

**Case 3** A 35 year old Air Force captain with 16 years of active duty was admitted to the hospital with the chief complaints of cough, diffuse chest soreness, and exertional dyspnea of one week's duration.

This officer had been in excellent health during his entire life until about one week prior to admission at which time he developed mild exertional dyspnea and cough which he attributed to a "cold." Shortly thereafter he noticed a constant aching chest discomfort without associated fever, chills, or sweating. For about two weeks prior to admission he had noted a gradual gain in weight associated with slowly increasing ankle swelling. Two nights prior to admission he experienced an episode of paroxysmal nocturnal dyspnea. The night before admission he was orthopneic and rested in a chair for the entire night. At no time had he been aware of any palpitation or irregularity of heart action.

Physical examination on admission revealed an acutely ill orthopneic white male. His oral temperature was 99°F, weight 196 pounds and blood pressure 105/85 mm Hg. There was slight neck vein distention. Cardiac examination revealed a widening of the left heart border 2 cm beyond the midclavicular line with a soft systolic blowing grade II mitral murmur. There was total irregularity of rhythm and force of cardiac systole. The apical rate was 160 and there was a pulse deficit of 80 per minute. The breath sounds were equally suppressed bilaterally and crackling inspiratory rales were audible over the lower two thirds of both lung fields. The liver was enlarged 4 cm below the costal margin in the midclavicular line and there was a 2 to 3 plus pitting edema of the lower extremities. An electrocardiogram confirmed the clinical diagnosis of atrial fibrillation and a roentgenogram of the chest revealed widening of the cardiac silhouette with bilateral pulmonary edema.

The patient was placed on bed rest with his head elevated to 70° given a low sodium diet, Mercurhydrin (brand of meralluride sodium) and ammonium chloride, and rapidly digitalized with 1.6 mg of Cedilanid (brand of lanatoside C) given in divided doses of 0.8 mg three hours apart. Eight hours after admission his apical rate had slowed to 84 per minute and there was no pulse deficit. He was less orthopneic but the left cardiac border was still widened 2 cm beyond the midclavicular line and a short soft blowing grade I systolic mitral murmur was still present. Diuresis was accomplished rapidly and by the third day his weight had decreased to 166 pounds and the pulmonary congestion had disappeared. The heart murmur was no longer audible but the atrial fibrillation was still present at a ventricular rate of 70 to 80 per minute. He was kept on 0.2 mg of digitoxin daily and given 0.2 gram of quinidine every six hours. Twenty-four hours later the rhythm had converted to

normal and he was essentially asymptomatic. A repeat roentgenogram of the chest on the fourth day following admission revealed marked decrease in the cardiac dilatation and a clearing of the pulmonary congestion.

On two occasions—once two days later and again seven months later while he was an outpatient, atrial fibrillation recurred without symptoms. On both occasions a normal sinus rhythm was restored after the dosage of quinidine was increased. He was returned to military duty and maintained on quinidine.

*Comment.* This patient's condition is a very interesting example of a prolonged attack of fibrillation resulting in pronounced congestive heart failure. It is notable that he never had symptoms such as palpitation, referable directly to the irregular and rapid cardiac rate. The original symptoms were those of congestive heart failure. He was again asymptomatic seven months later when re-examination revealed a recurrence of the fibrillation.

**Case 4.** A 35 year old Air Force captain was seen in consultation because of recurrent paroxysmal atrial fibrillation and anginal type pain of one year's duration. Prior to the onset of the present complaints he was in excellent health. The patient used no tobacco and drank only occasionally. He was accustomed to eating heavily and drinking several cups of coffee daily.

He first consulted a doctor when he experienced moderately severe, pressure type retrosternal pain which radiated to the left side of the neck and left arm and lasted for six hours. A diagnosis of probable coronary insufficiency was made on the basis of the history, clinical findings, and serial electrocardiograms. Shortly after admission he was noted to have transient episodes of atrial fibrillation which recurred both at rest and with mild exertion and was associated at times with anginal type pain. These episodes subsided spontaneously or with small doses of quinidine. The results of a basal metabolic rate, serum cholesterol, upper gastro intestinal barium study, a roentgenogram of the gallbladder and cardiac fluoroscopy were normal.

He was placed on a regimen of 0.2 gram of quinidine four times a day and returned to duty after nine weeks. Four months thereafter quinidine was discontinued and physical examination was normal except for moderate obesity (weight 210 pounds). While carrying heavy suitcases two weeks later he experienced a sudden recurrence of palpitation with total irregularity of the heart followed in a few minutes by anginal type pain. These symptoms subsided about five hours after onset following self medication with quinidine, phenobarbital and aspirin.

One month later while falling asleep he experienced two or three "heavy heartbeats" followed immediately by tight chest discomfort and onset of total cardiac irregularity. On this occasion fibrillation continued for 16 hours until admission to the hospital. Physical examination revealed a moderately ill apprehensive man with atrial fibrilla-

tion an apical rate of 140 to 150 per minute and a pulse deficit of 15 to 20 beats per minute. Blood pressure was 106/76 mm Hg weight 206 pounds height 5 feet 9 inches. The fibrillation terminated with bed rest alone shortly after admission. Subsequent electrocardiograms revealed a normal sinus rhythm with occasional ventricular ectopic beats. A double Master two step test on two occasions produced no electrocardiographic changes indicative of myocardial ischemia. Total serum cholesterol was 195 mg per 100 ml. A fasting blood sugar and an oral glucose tolerance test were normal. Following discharge from the hospital he was continued on a reducing diet and 0.2 gram of quinidine four times a day. When last seen he had lost 20 pounds by dieting and was continuing on active duty as a personnel officer.

*Comment* This patient illustrates the problem of eliminating organic heart disease as a cause of atrial fibrillation when chest pain is a presenting complaint. Although coronary disease cannot be absolutely ruled out this officer was an introspective anxious individual and the chest pain as well as the fibrillation was believed to be of functional origin.

#### DISCUSSION

All of these patients with the possible exception of case 4, fall into the category of patients previously described as having "benign" "idiopathic" "functional" or "uncomplicated" atrial fibrillation. This arrhythmia occurs commonly in apparently healthy young individuals. In my experience during this period atrial fibrillation was observed much more frequently in normal persons than in individuals with abnormal hearts. This is readily understandable since persons with organic heart disease as a cause of fibrillation are not often serving on active military duty. Master and Eichert<sup>7</sup> previously emphasized the frequency with which they observed "functional paroxysmal auricular fibrillation" in U S Navy personnel during World War II.

It should be emphasized that atrial fibrillation is a physical diagnostic sign and not a disease per se. Whenever fibrillation occurs one is obliged to evaluate all possible causes both cardiac and extracardiac including rheumatic heart disease, hypertension, hyperthyroidism, coronary disease, infection, drugs and drug sensitivity, toxic agents, metabolic imbalance, trauma, fatigue, overexertion and neurogenic and emotional factors. The primary problem is to ascertain whether the fibrillation is a secondary manifestation of underlying heart disease or whether it is a primary functional disorder occurring in an otherwise normal heart.

A most careful examination is necessary to rule out organic heart disease in patients with "functional" transient fibrillation before regarding such patients as normal. Careful auscultation is necessary to exclude the presence of mitral stenosis and roentgenographic examinations should be employed to assure that there

is no abnormality of the cardiac silhouette or abnormal prominence of the left atrium. The basal metabolic rate, protein bound iodine, and radioactive iodine uptake should be determined if hyperthyroidism is suspected. Ballistocardiography, although not performed in this series, is a valuable adjunct to electrocardiography in uncovering otherwise undetectable evidence of cardiac disease. Selinger and Levin<sup>8</sup> reported abnormal ballistocardiograms in individuals with paroxysmal atrial fibrillation who showed no apparent evidence of heart disease by all other methods of evaluation.

That atrial fibrillation occurs in normal hearts has been proved reportedly at post mortem examination.<sup>11, 12</sup> Atrial fibrillation may be a physiologic disturbance of impulse formation and conduction and not necessarily a pathologic phenomenon. There is no pathologic change in the heart characteristic of auricular fibrillation.<sup>13</sup>

The factors which may disturb physiologic function and contribute to the production of atrial fibrillation in apparently normal hearts are many: drugs, chemicals, alcohol, tobacco, and even carbon monoxide.<sup>14, 15</sup> Friedlander and Levine<sup>1</sup> advocated the theory of a "trigger" mechanism of neurogenic origin as an important basis for the inception of such attacks. This explanation would certainly seem reasonable for a large percentage of the cases observed in this group. Hanson and Rutledge<sup>12</sup> reported that attacks of paroxysmal atrial fibrillation were associated with a psychogenic or functional element in 70 per cent of their cases. In the present series, emotional strain and/or alcoholism were precipitating factors in half of the patients.

As seen in this group of cases, the symptoms associated with paroxysmal atrial fibrillation may vary from total unawareness of its presence to advanced incapacitation from congestive heart failure. Wolff,<sup>12</sup> in a detailed analysis, reported 28 of 81 cases of paroxysmal atrial fibrillation to be asymptomatic, and while most authors agree that palpitation is the most common complaint, less frequently observed symptoms are faintness, dyspnea, and weakness. Syncope, although uncommon, has been reported to be caused by associated hypotension resulting from a very rapid heart rate or, more probably, from temporary cardiac arrest just preceding or following the paroxysm of fibrillation.<sup>14</sup>

Very interesting is the association between angina pectoris and paroxysmal fibrillation. Wolff<sup>12, 13</sup> reported angina to be induced by paroxysmal fibrillation in several patients, the majority of whom also experienced angina on effort. However, most authors<sup>11-13</sup> agree that atrial fibrillation and angina due to coronary disease rarely occur together. Transient fibrillation is frequently found during early acute coronary thrombosis<sup>12, 13, 20</sup> associated

with congestive failure secondary to arteriosclerotic heart disease.<sup>11 16</sup> Case 4 is interesting in this regard because the patient experienced anginal like pain in association with transient atrial fibrillation. Also, the pain occurred both at rest and on exertion and was relieved only irregularly by nitroglycerin. Although in this case a double Master two step test was negative on two occasions it is feasible that the chest pain and the fibrillation were manifestations of coronary artery insufficiency. On the other hand, the order in which symptoms appeared in this patient suggests that the angina may be caused by the paroxysm of fibrillation itself as described by Wolff.<sup>15</sup>

### Course and prognosis

Although it is possible for paroxysmal rapid heart action to cause death due to heart failure, embolism, vascular collapse, renal failure or cardiac arrest from conversion to ventricular fibrillation or asystole, this rarely occurs in actual cases of paroxysmal atrial fibrillation unassociated with organic heart disease. It can be seen that the course of transient atrial fibrillation has no set pattern. The majority of these patients continued to experience recurrent attacks. Attacks may also become less frequent and of shorter duration or may cease entirely either spontaneously or with drug therapy.<sup>12 21</sup> In about 10 per cent of cases,<sup>2</sup> episodes of paroxysmal fibrillation may assume a progressive nature with eventual establishment of a permanent fibrillation.

Although persistent atrial fibrillation is not often damaging, Wolff<sup>15</sup> and Phillips and Levine<sup>22</sup> emphasized that this arrhythmia produces abnormal circulatory dynamics resulting in cardiac enlargement and Brill<sup>23</sup> and Phillips and Levine reported cases similar to case 3 of this series, in which frank congestive heart failure resulted from atrial fibrillation alone. The latter stated that this is a reversible type of heart failure and advocated conversion to normal sinus rhythm with quinidine (plus digitalis if necessary) to prevent irreversible cardiac enlargement and chronic congestive failure.

Authors<sup>2 6 11 24 25</sup> have commented upon the good prognosis and the benign nature of transient atrial fibrillation when no organic heart disease exists. There is a favorable prognosis for patients under 40 years of age at onset and whose attacks continue intermittently for more than two years.<sup>24</sup> Willius and Dry<sup>25</sup> found the death rate in a series of 59 patients to be similar to that of the general population. The patients reported here with one possible exception can expect a favorable future.

The capability of these individuals to perform satisfactory military duty was not appreciably impaired by the transient episodes of fibrillation. It therefore seemed reasonable to allow them

to continue on active duty. Although Master and Lickert stated that "patients with functional proximal auricular fibrillation should be discharged from the Navy or at least placed on limited duty ashore," and Englefeldt<sup>12</sup> maintained that such persons should be given restricted civilian jobs, the numerous articles on this subject almost universally agree that this cardiac arrhythmia is harmless and that it seems unwarranted to limit these persons in their activities and thus contribute to an iatrogenic cardiac disability.

### Therapy

These patients should be fully informed regarding the benign nature of their disability and urged to eliminate those precipitating factors which are associated with the attacks of fibrillation. In one third of this group no specific cardiac therapy was needed, the episodes spontaneously subsiding.

Two drugs, quinidine and digitalis, are widely used in the treatment of atrial fibrillation. However, the patient with infrequent episodes of transient fibrillation of short duration is not in need of such therapy. A rapid ventricular rate, particularly if over 150 per minute, is the most positive indication for definitive therapy, since congestive failure may ensue, vascular collapse may develop, and the liability of embolism is increased.

The young patient with atrial fibrillation is an ideal subject for quinidine therapy, which should be administered to all patients who do not revert to normal sinus rhythm within 24 hours, provided, of course, there is no sensitivity to the drug. If congestive heart failure has supervened, the patient should first be rapidly digitalized to control the rapid ventricular rate, eliminate the pulse deficit, and improve the myocardial contractility. Most cardiologists agree that quinidine should not be used before compensation is restored because attempts at conversion under such circumstances may result in a more pronounced and uncontrollable tachycardia or embolism. In many instances the fibrillation will revert to normal sinus rhythm after digitalization has restored compensation. If not, quinidine should then be given to convert the arrhythmia. After conversion is effected, the patient should be placed on a maintenance dose of 0.2 gram of quinidine three to four times daily for a few days, during which time digitalis may be discontinued. Quinidine may then be gradually decreased to a maintenance dose sufficient to prevent recurrences, or it may be discontinued. Differences of opinion exist as regards the efficiency of maintenance quinidine in the prophylaxis of recurrent atrial fibrillation. My personal preference is to recommend maintenance therapy in persons whose attacks become more frequent and of longer duration or whose episodes are associated with symptoms ensuing from tachycardia.

## SUMMARY

Sixteen young military men with transient atrial fibrillation were observed in whom no definite evidence of organic heart disease could be found. In military medicine when predominantly young men on active military duty are seen atrial fibrillation may often be the idiopathic or benign variety. However the most common causes of this arrhythmia rheumatic and arteriosclerotic heart diseases hyperthyroidism hypertension and coronary artery disease, must be ruled out.

In about 10 per cent of the patients with functional transient atrial fibrillation the episodes of arrhythmia may become progressive with eventual establishment of permanent fibrillation. The remainder either have recurrent attacks fairly regularly or the episodes may become less frequent of shorter duration or may cease entirely either spontaneously or with drug therapy.

This arrhythmia in the absence of organic heart disease is benign and has an excellent prognosis. The ability of these patients to perform satisfactory military duty is not appreciably impaired.

The patient with infrequent fibrillation of short duration and mild or no symptoms (one third of this series) requires no definitive therapy. A rapid ventricular rate, particularly if over 150 per minute, is the most positive indication for definitive therapy with digitalis and/or quinidine. All patients should be thoroughly instructed as to the benign nature of this disorder and urged to eliminate precipitating factors. Maintenance therapy with quinidine is recommended for patients whose attacks become progressively more frequent and of longer duration, and whose symptoms of an excessively rapid heart rate are pronounced.

## REFERENCES

- 1 Gossage A M and Braxton Hick J A B On auricular fibrillation. *Quart J Med.* 6, 435-440 July 1913.
- 2 Parkison J and Campbell M P on auricular fibrillation recorded for 200 p. in *Quart J Med.* 23, 67-100 Oct 1930.
- 3 Fowle W M and Biddis C W Auricular fibrillation a only manifestation of heart disease. *Am Heart J* 6, 183-191 Dec 1930.
- 4 Mohler H K and Lantgen C. Auricular fibrillation an analysis of 220 cases. *Pennsylvania M J* 35, 68-74 Nov 1931.
- 5 Ecclesland R D and Livi S A Auricular fibrillation and flutter without evidence of organic heart disease. *New England J Med.* 211, 624-629 Oct 4 1934.
- 6 Ogata E S Wolff L and Whit P D Uncomplicated auricular fibrillation and auricular flutter its question of cure and good prognosis in patient with or without evidence of cardiac disease. *Arch. Int. Med.* 57, 493-513 Mar 1936.
- 7 Mast A M and Eckert H Function of paroxysmal auricular fibrillation. *Am J M. Sc.* 211, 336-345 Mar 1946.
- 8 Ling T A G and Le S L Use of ballistocardiography in evaluation of paroxysmal rapid heart action. *J A. M. A.* 155, 897-899 July 3 1954.
- 9 Fithgham C Auricular fibrillation and its treatment. *Arch. Int. Med.* 36, 437-443 Sept 1925.

- 10 Yater W M Pathologic changes in auricular fibrillation and allied arrhythmias *Arch. Int. Med.* 43 809-834 June 1929
- 11 Luten D and Jeffreys I O: Clinical significances of auricular fibrillation *J. A. M. A.* 107 2099-2102 Dec 26 1936
- 12 Hanson H H and Rutledge D Jr: Auricular fibrillation in normal hearts *New England J. Med.* 240: 947-953 June 16 1949
- 13 Wolff L: Clinical aspects of paroxysmal rapid heart action *New England J. Med.* 226 640-648 Apr 16 1942
- 14 Corneau W J: Mechanism for syncopal attacks associated with paroxysmal auricular fibrillation *New England J. Med.* 227 134-136 July 23 1942
- 15 Wolff L (Boston): Angina pectoris (or status anginosus) and cardiac asthma induced by paroxysmal auricular fibrillation and paroxysmal tachycardia: value of quinine sulphate in treatment of these conditions *New England J. Med.* 208 1194-1197 June 8 1933
- 16 Brill I C and Meissner W A: Role of coronary artery disease in etiology of auricular fibrillation *Ann. Int. Med.* 14 1341-1347 Feb. 1941
- 17 Cookson H: Aetiology and prognosis of auricular fibrillation. *Quart. J. Med.* 23 309-323 Apr 1930
- 18 Lewis T: *Diseases of the Heart* The Macmillan Co. New York N. Y. 1937 pp 31-50
- 19 Levine, S. A: *Clinical Heart Disease* W B Saunders Co Philadelphia Pa 1936, pp 212-214
- 20 Brill I C: Auricular fibrillation: present status with review of literature *Ann. Int. Med.* 10 148-1502 Apr 1937
- 21 Goldbloom A and Segall H N: Progress report on case of auricular fibrillation demonstrated in isolation of three months *Canad. M. A. J.* 55 301-303 Nov 1946
- 22 Phillips E and Levine S A: Auricular fibrillation without other evidence of heart disease: cause of reversible heart failure *Am. J. Med.* 7 478-489 Oct 1949
- 23 Brill I C: Congestive heart failure arising from uncontrolled auricular fibrillation in otherwise normal heart: follow-up notes on previously reported case *Am. J. Med.* 2 344-347 May 1947
- 24 Cooke W T and White P D: Prognosis in paroxysmal tachycardia and paroxysmal auricular fibrillation *Brit. Heart J.* 4 133-162 Oct 1942
- 25 Willis F A and Dry T J: Prognosis of auricular fibrillation of undetermined origin *J. A. M. A.* 117 330-332 Aug 2 1941
- 26 Engelfeldt E: Paroxysmal auricular fibrillation of functional type *Nord. med.* 50: 1257-1260 Sept 10 1953



# TRENDS IN THE MANAGEMENT OF PULMONARY TUBERCULOSIS

CARL W TEMPEL *Colonel MC USA*  
JAMES A WIER *Colonel MC USA*

**T**UBERCULOSIS is a serious problem in the United States just as it is in most nations of the world. Despite a dramatic decline in mortality of 70 per cent in the last 10 years to the current rate of about 10 per 100 000 population the morbidity rate and cost of medical care is still high. This is evidenced by the fact that 1 200 000 persons have some form of tuberculosis. 250 000 are carried on the caseload of health agencies as active cases, 86 000 persons were added to the active caseload within the past year, an estimated 150 000 persons have undetected tuberculosis, and the annual expenditures for action prevention and treatment are around six hundred million dollars.<sup>1</sup>

The availability of new effective antituberculous drugs and surgical procedures has increased the potential for the cure of tuberculous patients. Because of these advances the responsibility of the physician to utilize these new methods of treatment to the best advantage has greatly increased. For this reason it is important to review periodically trends in the management of this serious disease.

## HOSPITALIZATION AND HOME-CARE PROGRAMS

It is generally recognized by tuberculosis specialists the world over that when hospital facilities are available the patient with newly discovered active pulmonary tuberculosis should receive his initial treatment in the hospital rather than at home. In the ideal situation such treatment is best continued in a tuberculosis hospital until the disease becomes arrested or inactive that is no tuberculosis organisms are recovered from the sputum (conversion) and a noncavitary pulmonary lesion is stable for a period of from 3 to 6 months. Under less favorable circumstances it is helpful to at least hospitalize the new patient for several months to (1) secure a proper diagnosis and evaluate the individual pa-

---

From Fitzmaurice Army Hospital Denver, Col. Col. Tempel is wing commander, Tuberculosis Office of The Surgeon General's Headquarters, U.S. Army Forces Far East, APO 343, San Francisco, California.

tient, (2) educate the patient and his family as to the nature of the disease, (3) treat the patient with specific drugs until the therapeutic goal appears to be in sight, and (4) reduce the risk of contagion to members of his family and the community. Treatment in the home during the early contagious stage of the disease is difficult for the patient, hazardous for his associates and unsatisfactory from the physician's standpoint in most cases. The modern tuberculosis hospital is a complex institution with complete clinical and laboratory facilities, an elaborate radiologic department, a professional staff of internists, surgeons and consultant specialists, research workers, social workers, and rehabilitation and educational experts—all of which are essential to the successful and enduring clinical results.

Except when hospital beds are unavailable or when persons refuse hospitalization, most of the home care programs in the United States are concerned primarily with pre and posthospital treatment rather than with a planned replacement of hospital care by outpatient care. Most authorities now agree that when hospital care is unavailable for any reason, active drug therapy should nevertheless be instituted promptly. The need for prolonged prehospital treatment is diminishing in most sections of the United States as the hospital waiting lists are rapidly disappearing.

In some countries the incidence of tuberculosis is so high that hospitalization for most patients is out of the question. Under such circumstances attention must be focused on the establishment of effective health centers to conduct extensive case finding surveys and to operate outpatient services for patients undergoing treatment at home. If private physicians co-operate well with public health officials, it is possible to conduct such a program satisfactorily as long as an adequate number of public health nurses are available to visit the patient's home and to administer that phase of supervision which deals with proper isolation techniques, the evaluating of contacts, and similar phases of tuberculosis control.

#### REST THERAPY AND REHABILITATION PROGRAMS

During the past few years there has been considerable disagreement regarding the time honored measure of rest therapy, and gradual changes are being adopted. With the introduction of successful drug therapy reorientation was inevitable, but it will be some time before optimal standards can be determined. Possibly the modifications and shortening of rest treatment are proceeding too rapidly, but if so this is not yet reflected either in a slowing of the rapid rate of decline in mortality or in any definite increase in morbidity. On the contrary, the trends appear to be continuing favorably.

In July 1954 an investigation of in hospital ambulation of patients with pulmonary tuberculosis was begun at this hospital.<sup>2</sup> It is a randomized study designed to compare the results of treatment as observed during the conventional rest program with patients undergoing the ambulatory treatment regimen. The latter group do not observe rest periods and are allowed to be up and around the hospital wards and grounds near the hospital building at will. Strict isolation care is adhered to. Thus far no appreciable difference has been noted in the response of the two groups as measured by sputum conversion and by roentgenographic evidence of clearing of the lung lesions. The morale of the ambulant group is much better than in those treated with strict bed rest. The educational and rehabilitation training can begin shortly after admission and can be utilized in a better manner in the ambulant group. Inasmuch as patients take care of many of their own needs, fewer nurses and ward attendants are required to supervise the ambulatory treatment regimen. Thus far this disregard for the traditional rest program apparently has not harmed the patient. It should be pointed out, however, that these studies have been made under the close supervision of the staff of a specialized treatment center where patients are treated with antituberculous drugs to the stage of arrested or inactive disease.

Ambulation of patients with pulmonary tuberculosis under protection of chemotherapy has been reported on favorably by Dressler and associates<sup>3</sup> and less favorably by Robins and associates.<sup>4</sup> In the study by Dressler and associates conducted at the National Jewish Hospital, Denver, Colo., patients received their medical therapy in the hospital but were permitted to undergo outpatient treatment for active disease when their physical condition and home facilities permitted. Co-operation among the patients was good and the results appeared to be impressive. No control studies were made in this group.

The chief criticism of the ambulatory treatment of patients at home under unfavorable conditions is that persons with contagious stages of the disease are at large in the community. Those who oppose this type of program, however, fail to appreciate that if it were not available, most of these patients would be receiving no treatment. Such compromise must be made if hospital beds are not available or if the state or federal laws do not permit enforced treatment of the recalcitrant or unco-operative patient. The obvious answer to this difficult problem is an acceptable hospital and home care treatment program and health laws to provide adequate isolation of the patient with contagious forms of this disease. For practical purposes the latter should include all tuberculous patients with positive sputum, any person with pulmonary cavitation, patients with recently discovered active pulmonary tuberculosis and those with active disease not receiving drugs.

The rehabilitation program for tuberculous patients in hospital or at home must of necessity be planned to meet patient and community needs, and it is most difficult to formulate plans applicable for all conditions. Under most circumstances, however, it is desirable to standardize the rest and rehabilitation program. Unless this is done, personnel of tuberculosis hospitals, outpatient departments, and public health nurses will not always be acquainted with the stage of recovery of the individual patient and the treatment or training applicable for each. The physical and economic rehabilitation of the patient is receiving much attention these days because more patients are recovering than ever before and plans for their future employment are extremely important to the individual and the community. The rehabilitation program can best be administered by a classification of patients based on the activity of the lung disease and the patient's physical capacity to be restored to normal life activities and gainful employment. Such a plan has been used successfully for many years by the United States Army in the treatment program at this hospital and can be modified for civilian patients.

The basic plan of management for the patient with a new minimal lesion (active disease, 1 month) responding ideally to treatment is illustrated in table 1. Such schedules are carefully planned for each individual patient on the basis of clinical findings, but the minimum time limits should seldom be reduced. Patients with more advanced forms of the disease are treated on the same principles but their exercise status is altered more slowly, and frequently with the addition of operative procedures. To classify the patient for rehabilitation purposes the diagnosis should indicate the duration of activity and inactivity of the disease and the exercise status.

The basic rules for the management of patients with pulmonary tuberculosis are

- 1 *Bed rest and chemotherapy* are prescribed for all patients with active tuberculosis on definitive treatment and are maintained until the pulmonary lesion is found stable in serial roentgenograms for 3 months. Increased ambulation with passive privileges is then allowed.

- 2 *Ambulatory treatment* (exercise status III B) is permitted after the disease becomes inactive and the lesion is stable for 6 months. For most lesions it is desirable to use chemotherapy to this stage of disease or longer.

- 3 *Hospital care* is best used until the chest lesion is stable for from 3 to 6 months. It is desirable to defer discharge until the patient has been ambulatory for 3 months and the response (symptoms, sputum, and roentgenograms) to graded exercise has been determined. When hospital beds are not available or no

TABLE 1 Rehabilitation program for patients with new minimal lesions and optimal response during therapy

L a s i n		Clinical finding				D i e t a r e s t a n d r e h a b i l i t a t i o n	
Activity	D r i n (mo ths)	Symptoms	Sputum	Roe tæno gram	Status	Program	
Active tuberclosia	1	Hemoptysis f v c o g h ab ndant ap tum	Pos t i c	Unstable	I	Strict bed rest Bedsoild nursing ery imp riant	
	2	Ab nt	Pos t i	Unstabl	II	M diff d bed rest with bathro m privileges and 4 h r s r o f b e d d i l y s s y m p t o m s a b a i d e c r e s h o u l d b e u s e d i n t h e p r e s e n c e f e x t n a s i v e d i s e a s e a d / o r c a v i t a t i o n B d a i d e n u r s i n g c a r e n o t r e q u i r e d	
	3	Absc t	N g t i v e	Unst ble			
	4 6	Ab nt	Negati e	Stable			
		7 9	Abs t	Negati e for 3 m ths	St ble for 3 mo ths	III A	Semi mbula t c r e w t b 8 hours out of bed d i l y p r s s p r i l l e g a t i o n e c a r w h e n f e a s i b l e a t t h i s s t g e

TABLE 1 Rehabilitation program for patients with new minimal lesions and optimal response during therapy—Continued

Lesion		Clinical findings			Basic test and rehabilitation	
Activity	Duration (months)	Symptoms	Sputum	Röntgenogram	Status	Program
Inactive tuberculosis		Absent	Negative for 6 months	Stable for 6 months	III B	ambulatory care with 12 hours out of bed daily Discharge from treatment center to home at this time
		Absent	Negative from 6 to 12 months	Stable from 6 to 17 months	II	normal life when disease is inactive 6 to 17 months restricted type of work at first and full duty or work in 7 to 8 years as judged by the physical capacity of each patient The extent of the residual disease also will be a determining factor in the type of work permitted

Based on Diagnostic Standards and Classification of Tuberculosis national Tuberculosis Association 1955 which should be consulted in formulating such plans and for definition of terms used in the table

Stable Noncavitary lesions by serial roentgenograms

needed for definitive treatment (chronic inoperable cases et cetera) home care may prove satisfactory if the patient (a) does not require specialized hospital treatment, (b) has a suitable place for his care and isolation, (c) understands tuberculosis and (d) will not be a community health problem

4 The patient may live an essentially normal life (exercise status IV) after the disease has been inactive for from 6 to 12 months except that exercise must be restricted Physical activity is then gradually increased over a 2 to 5 year period, based on an evaluation of each individual patient's physical capacity (exercise or work tolerance)

5 The same principles apply to surgical cases Patients having resections for pulmonary lesions often go home from 3 to 6 months after an operation Six months in the hospital is desirable after resection or thoracoplasty for extensive disease

### CHEMOTHERAPY AND OPERATIVE PROCEDURES

A review of the trends in the use of antituberculous drugs and the surgical treatment of tuberculosis reveals that these measures must frequently be combined for this reason certain precautions must be observed Furthermore the responsibilities of the general practitioner the internist and the thoracic surgeon in the cooperative effort to cure the tuberculous patient may be better understood if these two types of therapy are discussed together

Drug therapy of tuberculosis often produces dramatic results but it must be remembered that frequently it is not curative and must be integrated with a good rehabilitation program (table 1) as well as with operative measures (table 2) as the individual case dictates

Reversible lesions responding well to drug therapy may be treated by any effective long term drug regimen [streptomycin sulfate para aminosalicylic acid (SM PAS) streptomycin sulfate isoniazid (SM INH) and isoniazid para aminosalicylic acid (INH PAS)] without fear of future complications in the majority of the patients However when acute caseous pneumonic tuberculosis chronic fibrocaseous or fibrocavitary disease is present one must be ever mindful that drugs may not prove definitive and that surgical resection or other operative procedures may be required for the serious residuals remaining after adequate chemotherapy It should be borne in mind that the persistent cavity is the main problem in the management of tuberculosis today In the patient capable of tolerating an operation these must be treated surgically In addition to these chronic caseonodose lesions not responding satisfactorily to medical management large necrotic foci especially the residuals of recent cavitation symptomatic tuberculous bronchiectasis and the destroyed lung lobe or segment constitute lesions ordinarily beyond the definitive use of drug therapy

January 1957)

Pulmonary cavitation that does not respond to medical treatment in 6 or 8 months is not apt to disappear and the appearance of drug resistance counts after this period of chemotherapy. It has been shown in a carefully controlled study at this hospital that after utilizing our best combined drug regimen, approximately three fourths of the cavities present before the initiation of chemotherapy were still visualized in the routine roentgenogram of the chest at 4 months, 50 per cent at 6 months and 22 per cent at 8 months. With the protection of effective drug therapy, pulmonary resection was accomplished in most of the patients complicated as favorable operative risks with a very low mortality and morbidity rate. Recent reports show an overall mortality of 14 per cent in pneumonectomies, 4 per cent in lobectomies, and 1 per cent in segmental and subsegmental resections. At this hospital, where the predominant type of operation in the past two years has been resection for localized lesions, the mortality rate was less than 1 per cent. The major complication of chest surgery is the development of bronchopleural fistula but results are better under circumstances where drug protection is most effective. Complications are more of a problem in treatment cases where drug resistance has appeared. It is important, therefore, to establish a plan of management that integrates the need for surgery in the overall medical program, particularly in relation to proper timing.

Combined drug regimens utilizing the three best chemotherapeutic agents in one combination is isoniazid (SM), INH, PAS, or SM INH PAS) have been superior to the administration of single antimicrobial agents and their dosage and method of utilization has been well documented in the literature.<sup>1,2,3</sup> At least one of the most potent agents, streptomycin sulfate or isoniazid, should be reserved for use in the event that a resistant organism or reinfection develops. In general, patients undergoing home care are best treated with the INH PAS regimen. Streptomycin sulfate is usually more conveniently employed for those patients who are undergoing hospital care. When prolonged treatment with SM is anticipated for patients having extensive disease in whom the outcome is very much in doubt (e.g., bilateral cavitory disease), it is desirable to combine SM with PAS (to conserve INH) unless PAS intolerance makes its combination with INH necessary. The experienced chest physician will recognize pulmonary lesions which may be expected to respond favorably in from 1 to 2 years to a well integrated therapeutic program, and it makes little difference what combination of drugs (SM, INH, and PAS) are utilized in such patients. These include, for example, patients with minimal pulmonary lesions, uncomplicated pleural effusion, recent noncavitory lesions of moderate extent which are presumed to be predominantly reversible by their diffuse or ill defined characteristics in the chest roentgenograms,



TABLE 2 Integrated drug and surgical treatment of pulmonary tuberculosis based on an estimate of the lesion

Classification of lesions	Medical treatment	Surgical treatment
Undertreated	Standard therapy directed by clinical signs and response as revealed by bacteriologic and roentgenologic studies	Specific drug prophylaxis and/or thoracoplasty
Reversible	Reversible lesions remediable by medical means. Use of drugs and surgery until the irreversible stage of disease. Operative procedure required.	
Irreversible	Irreversible lesions remediable by medical means. Use of drugs and surgery until the irreversible stage of disease. Operative procedure required.	
Reversible	Reversible lesions remediable by medical means. Use of drugs and surgery until the irreversible stage of disease. Operative procedure required.	
Acute	Acute lesions remediable by medical means. Use of drugs and surgery until the irreversible stage of disease. Operative procedure required.	
Chronic	Chronic lesions remediable by medical means. Use of drugs and surgery until the irreversible stage of disease. Operative procedure required.	

After 6 to 12 months of drug therapy, if the response is not satisfactory, surgical intervention is indicated. (See table of resectional components below)

TABLE 2 Integrated drug and surgical treatment of pulmonary tuberculosis based on an estimate of the lesion-class

Classification of lesions	Medical treatment	Surgical treatment
Reversible and irreversible —Cont'd— Chronic fibrocystic epithelioma (adenomatous and intracystic lesions)	Specific drugs Temporary collapse	Excision of the lesion Resection of the breast
Mixed lesions with a reversible exuberant component Irreversible fibrocystic component	Reversible lesions: tamoxifen, endocrine therapy Exuberant lesions: tamoxifen, endocrine therapy Irreversible lesions: tamoxifen, endocrine therapy	Excision of the lesion Resection of the breast

and finally the more serious necrotic lesions with or without cavitation so well localized that definitive surgical treatment may be considered after 6 to 12 months of drug therapy. At the present time there appears to be no need to combine all three of our commonly used drugs (SM, INH and PAS) in the routine treatment of pulmonary tuberculosis. Complications of miliar or meningeal disease or seriously ill patients with acute caseous pneumonic tuberculosis are exceptions to this generalization.

It has been fairly well established that prolonged uninterrupted drug treatment produces the most lasting treatment results. Follow up studies at this hospital have revealed a high relapse rate in patients treated in the prechemotherapy era. This was greatly reduced by the utilization of short drug regimens (from 2 to 6 months) but following the adoption of long term chemotherapy in 1951 with treatment continued to the stage of inactive disease less than 5 per cent of the patients have had relapses (table 3). From these studies it is reasonable to conclude that drug therapy should be used for patients undergoing definitive treatment until the lesion has been well stabilized for a prolonged period. The therapeutic target point of "inactive disease" as defined by the National Tuberculosis Association means that the patient has no symptoms due to tuberculosis, the sputum is negative and the roentgenograms of the chest reveal a stable noncavitary lesion for at least six months. If this stage of recovery is reached in less than 12 months drug therapy should be continued for a minimum of one year. After surgical procedures particularly resection for lesions revealing active disease in the resected lung specimens, drugs should be continued no less than from 6 to 12 months after the operation.

There have been no new developments in the field of operative procedures for pulmonary tuberculosis except for the virtual abandonment of pneumothoraxy, decreased use of thoracoplasty and the extended use of pulmonary resection. Of the temporary collapse procedures so important a few years ago only pneumoperitoneum has carried over into the current chemotherapy era. Its value is perhaps limited to the treatment of cavitory disease used early in the course of treatment<sup>10</sup> but the operation is used infrequently today. Primary thoracoplasty is seldom employed but it may be useful for cavitory disease of the upper lobes when disease elsewhere is too extensive to consider resection. The removal of localized pulmonary lesions has been made possible by prolonged chemotherapy and proportionately more wedge and segmental resections are now possible. These trends are well illustrated by the statistics of chest surgical procedures utilized at this hospital during 1947-1955 (table 4).

One new chemotherapeutic agent, cycloserine, has been introduced recently under the proprietary names Seromycin and Oxa

TABLE 3 Distribution of temporary retired cases reviewed at 1st January 1957 to 1 January 1957

Type of disease	Year retired	Total cases	Permanently retired	Temporary retired because of	Temporary retired because of	Total
Primary Tuberculosis	1950	30	41	0	0	1
	1951	108	88	10	1	10
	1952	55	112	1	0	1
	1953	318	23	51	4	1
	1954	120	82	32	0	0
Total		738	(60)	14	10	33 (4.5%)
Pleuropathy with effusion	1950	17	13		1	
	1951	45	44		1	1
	1952	7	5	2		
	1953	103	101			
	1954	61	54	7		
Total		241	266	11	4	1 (0.4%)
Other tuberculosis	1950	13	13			
	1951	13	10	3		0
	1952	8	8			
	1953	29		3		
	1954	15	11	4		
Total		78	65	10	0	2 (2.5%)
Grand total		1117	934	160	14	36
			(84%)	(14%)	(1%)	(3.2%)

Permanently retired because of Tuberculosis 3  
 Not tuberculous disease 11

14

Refugees are included in either the permanent retirements or the temporary retirements continued

pyrazinamide<sup>10-11</sup> This antibiotic is undergoing clinical investigations at present and is not available for general use. Preliminary reports indicate that the drug alone is less effective than other combined regimens, however, in combination with INH it may prove effective. At dosages of 1 gram daily, or higher, convulsions will occur in about 5 per cent of patients. None have been reported with dosages of 0.5 gram daily. The role of Pyrazinamide

mide (brand of pyrazinoic acid amide)<sup>12-17</sup> has not been clearly defined in spite of extensive study in the past few years. Its best application appears to be in combination with INH but its hepatotoxic effect limits its use and it has not been made generally available.<sup>10, 12, 17</sup>

TABLE 4 Thoracic surgical procedures at  
Fitzsimons Army Hospital 1947-1955

Year	Thoracoplasty	Pulmonary resections	
		All types	Segmental and wedge
1947	90	13	6
1948	96	34	10
1949	28	65	9
1950	44	82	16
1951	32	121	39
1952	23	128	80
1953	21	208	128
1954	2	235	174
1955	2	123	84
Total	338	1 008	546

Lobectomy 443; pneumonectomy 29; segmental resection 385; wedge resection 161

### DISCUSSION

The improvements that have been made in the management of pulmonary tuberculosis in the past five years have greatly increased the patient's chances for recovery. Furthermore, statistical studies made on the health of patients who have recovered from this disease during the era of prolonged chemotherapy show that most patients treated to the stage of inactive disease remain well (table 3).

There are a considerable number of patients who cannot be treated successfully because of inoperable, active, far advanced disease. There is presently no solution for these problems and because of the factor of contagion, rehabilitation of the patient to a useful place in society becomes difficult even though his general health remains good. Hope for partial rehabilitation for this group of so-called "good chronics" lies in the possible total eradication of *Mycobacterium tuberculosis* from the body by some effective drug combination not yet discovered, thus removing the public health hazard. Conversion of the sputum to negative with the continuous use of agents now available is helpful in this

group of patients, but experience is lacking on how many years these drugs will keep the sputum negative

Still another group of individuals who are greatly improved by chemotherapy do not fully recover because of persistent cavity residuals and the unavailability of effective surgical treatment. This group offers a great challenge for the future. Since all operable patients with persistent cavity tuberculosis require surgical treatment, the training of more thoracic surgeons is a matter of great urgency in most countries.

Pulmonary tuberculosis in patients who have received drug therapy has been a subject of much interest in recent years. In spite of intense investigation, one of the most controversial problems has been the method of choice of treating necrotic foci of varied size and extent which remain after prolonged courses of chemotherapy. Many of these patients without persistent cavitation recover and remain well, but the threat of relapse under physical stress and the prolonged physical restriction required to assure continued good health makes this problem of more than academic interest. It is known that present day antimicrobials do not sterilize the necrotic lesion and *Mycobacterium tuberculosis* persist in many of these areas. Furthermore, healing of the unsloughed necrotic focus is by the slow process of fibrous encapsulation and gradual drying out of the contents which may require many years.

The sloughing of the necrotic lesion results in cavitation which must terminate in one of the following ways. First of all, it may slough completely and close cleanly, leaving only a small scar of no clinical importance. The opening of the cavity may close and constitute the so-called blocked cavity or tuberculoma with its accumulated caseous and necrotic tissue. These lesions are potentially dangerous because it is unusual for them to absorb and difficult for them to organize or to slough completely so that viable *Mycobacterium tuberculosis* can persist in them for long periods and eventually be disseminated. Mitchell has shown a 25 per cent clinical relapse in such cases prior to chemotherapy.<sup>18</sup> Studies at this hospital revealed from drug assays of resected tuberculomas that streptomycin sulfate does not penetrate the fibrous walls and viable bacilli are frequently present.<sup>19</sup> Another result that follows sloughing of necrotic lesions may be the maturation of so-called open cavity healing in which epithelialization of the bronchocavitary junction prevents complete closure by interfering with the approximation of the opposing granulation tissue surfaces. It is rare that such a lesion exists as an innocuous focus. More often than not, caseous areas remain in or near the cyst-like cavity wall and hence such lesions must always be presumed dangerous. Finally, the sloughing of the caseous lesion may result in an open cavity with necrotic walls containing

numerous viable *Mycobacterium tuberculosis*—the most dangerous of all lesions as far as contagion and spread of infection is concerned

The question of how to treat the patient with negative sputum and who has small residual noncavitary, necrotic foci has not been completely answered but the trend is toward conservative treatment. The solution to this problem is a difficult one because diagnostic methods are not exacting enough to differentiate those lesions which are well encapsulated and stable from those which have great potential for breakdown because of their bronchial communications and lack of fibrous encapsulation. It is known that cavities and foci of active disease that were unsuspected by roentgenographic examination are sometimes found by the surgeon at the operating table. Furthermore one cannot determine preoperatively the bacterial flora of the necrotic focus whether the organisms will be abundant or whether it will be difficult to culture them due to the bacteriostatic effect of the low oxygen tension and presence of organic acids. The real significance of the few organisms that survive in a dormant state has not been determined but it must be presumed that they carry danger of relapse for many years. Studies have been proposed to solve the problem of therapy for those patients by analyzing the results after treating some with resection of the lesion and treating others by prolonged drug therapy. This of course will be limited largely to research centers and until a solution is forthcoming through long term follow up studies one must arbitrarily decide from the present available facts the treatment of choice. Unless there is evidence that the disease is not controlled well by chemotherapy as evidenced by clinical roentgenographic or bacteriologic findings patients with small caseous foci should have drug therapy at the present. The gratifying results from antimicrobial therapy alone and the unavailability of thoracic surgeons to operate on the known cavitary lesions in patients urgently in need of surgery fully justifies this approach at present.

It is recognized that drug therapy and operative procedures are very important in the treatment of the tuberculous patient but it should be remembered that the total rehabilitation of the individual to his rightful place in society requires much more. We are treating an individual and not just a pulmonary lesion. Patients must be carefully supervised until they recover from their disease and then be placed in positions of employment that will give them a reasonable chance of remaining well. The importance of this phase of management is well illustrated by the experiences at this hospital (table 3). Eighty four per cent of 1117 tuberculous patients among military personnel treated in the hospital to the inactive stage of the disease were rehabilitated and declared fit for restoration to duty in the period 1949 to 1956. The relapse rate in this series was only 3.2 per cent and there were no deaths.

January 1957)

due to tuberculosis. This is good statistical evidence that a carefully controlled rehabilitation program is quite worthwhile.

### CONCLUSIONS

The present and treatment of pulmonary tuberculosis permits a very optimistic viewpoint for patients presently undergoing treatment and for continued success in the future. Inasmuch as all studies confirm the fact that those persons found in the initial stages of the disease can almost be assured of recovery and future good health if they co-operate with their physician, the responsibility to discover and treat these patients early is one of our most urgent problems. The success in treatment depends almost entirely on the extent of the chronic necrotic and cavity residuals remaining after 6 to 12 months of specific drug therapy. If these residuals are very extensive, the opportunities for utilizing modern methods of therapy in a definitive manner may be lost.

In the final analysis, each patient with pulmonary tuberculosis must be judged individually, and the choice of his treatment made in relation to the character of the disease, the behavior of host resistance, the character of the chronic residual, and the degree of stress expected in the individual.

### REFERENCES

- 1 National Tuberculosis Association *Annual Report* Apr 1 1954 to Mar 31 1955
- 2 Wier J A Morse W C Teiser O L Curry F C Taylor R R and Richey C B Evaluation of ambulatory versus non-ambulatory treatment of hospitalized patients with pulmonary tuberculosis. *Transactions of the 15th Conference on Chemotherapy of Tuberculosis* St Louis Mo Feb 1956 by the Veterans Administration Army and Navy with the cooperation of the National Tuberculosis Association
- 3 Dressler S H Anthony F M Russell W F Jr Crow J B Dent J Cohn M L and Middlebrook G Ambulation of patients with pulmonary tuberculosis under protection of chemotherapy: preliminary report. *Am Rev Tuberc* 70 1030-1041 Dec 1954
- 4 Robins A B Abeles H Chavez A D Aronson M H Breuer J and Tidlock D Oral antimicrobial therapy of nonhospitalized tuberculous patients. *Am Rev Tuberc* 70 1042-1052 Dec 1954
- 5 Department of the Army *The Management of Pulmonary Tuberculosis*, Department of the Army Technical Bulletin TB Med 236 22 Apr 1955
- 6 *Transactions of the 14th Conference on the Chemotherapy of Tuberculosis* Atlanta Ga Feb 7-10 1955 by the Veterans Administration Army and Navy with the cooperation of the National Tuberculosis Association pp 146-147
- 7 Eighth Annual Symposium on Pulmonary Diseases. Fitzsimons Army Hospital 1955
- 8 DeEsopo N D Current status of antimicrobial agents in treatment of pulmonary tuberculosis. *Am J Surg* 89 617-626 Mar 1955
- 9 King D S Present status of treatment of tuberculosis in man (Report to the Council on Pharmacy and Chemistry section) *J A M A* 158 829-831 July 9 1955
- 10 Wier J A Present status of treatment of tuberculosis. To be published in *J A M A*
- 11 *Quarterly Progress Report of the Veterans Administration-Army-Navy Study on the Chemotherapy of Tuberculosis*, Vol 10 No 3 Oct 1955 pp 18
- 12 McDermott W Ormond L Muschenheim C Deuschle J McCune R M Jr and Tompsett R Pyrazinamide-isoniazid in tuberculosis. *Am Rev Tuberc* 69 319-333 Mar 1954



- 13 Yeager R L, Munroe W G C and Dessa F I. Pyrazinamide (aldimide) in treatment of pulmonary tuberculosis. *Am. Rev. Tuberc.* 65: 523-546 May 1952.
- 14 Campaigne M, Calz A. and Hunter G. Observations on combined use of pyrazinamide (Aldimide) and isoniazid in treatment of pulmonary tuberculosis: clinical study. *Am. Rev. Tuberc.* 69: 334-350 Mar 1954.
- 15 Phillips S, Larkin J C, Jr, Lutzburger W L, Harris G E and Hirschman J S. Observations on pyrazinamide (Aldimide) in pulmonary tuberculosis. *Am. Rev. Tuberc.* 69: 443-450 Mar 1954.
- 16 Schwartz W S and Moyer R E. Chemotherapy of pulmonary tuberculosis with pyrazinamide, isoniazid and combined with streptomycin, para-aminosalicylic acid, or isoniazid. *Am. Rev. Tuberc.* 69: 413-422 Sept 1954.
- 17 McCune R M, Jr, Thompson R M, Heber M C, Ogden A B, et al. J and McDermott W. Pyrazinamide: a new antitubercular drug. In *Transactions of the 14th Conference on the Chemotherapy of Tuberculosis*. Atlanta, Ga. Feb 7-10 1955 by the Veterans Administration Army and Navy with the cooperation of the National Tuberculosis Association. pp 66-71.
- 18 Mitchell R. Personal communications.
- 19 Mink H W and Forse J H. Surgical treatment of tuberculous pulmonary lesions (tuberculous). *J. Thoracic Surg.* 19: 724-740 May 1950.

### A CONCEPT OF DIABETES

We do not know the cause of diabetes nor do we understand its very real relation to growth and size but apparently diabetes in the latent form (pre-diabetes) remains with the victim years or decades before he or she becomes overtly diabetic. During this time pregnancy, corticotrophin therapy, acquisition of Cushing's syndrome or of acromegaly, a staphylococcal infection or overeating may uncover the individual already predisposed to diabetes. The previously adequately compensating pancreas cannot stand the additional stress completely and evidence of the latent diabetic state is brought to the surface divulging its menacing presence by embryopathies or changes in carbohydrate tolerance. Hence it is wrong to talk of diabetes only when glycosuria and hypercalcaemia are present. It is a disorder which goes back much further than that—even into the womb.

—W P U JACKSON M D  
in *Lancet*, p 631 Sept 24 1955

# PLEURISY WITH EFFUSION DUE TO REMOTE TRAUMA

## A Differential Diagnosis for Acute Idiopathic Pleural Effusion

PERRY BERG (Captain USAF (MC))  
EUGENE P. TRIAKEL Captain USAF (MC)  
CHARLES B. SHIVER Jr. Captain USAF (MC)  
TIMOTHY A. CARIS Captain USAF (MC)

PLEURISY with effusion especially when discovered in young people, has long been a difficult and vexing problem to the clinician. In many cases a definitive diagnosis may be made with the roentgenographic and laboratory methods ordinarily available, in a considerable number however, the disease remains "idiopathic" despite careful and complete evaluation.

When patients with the "idiopathic" type have been observed over prolonged periods, it has been established that an appreciable majority eventually develop some signs indicative of tuberculosis.<sup>1-3</sup> In published series, the highest figure for the majority has been placed at 66 per cent,<sup>4</sup> it has been estimated however, that tuberculosis is the cause of as high as 90 per cent of cases of pleurisy with effusion without demonstrable cause.<sup>5</sup> Pathologic studies of pleural adhesions have reinforced this close relation up to the incidence of tuberculosis.<sup>6</sup> From these sources has evolved the clinical dictum that an idiopathic pleural effusion in a young person is tuberculosis unless proved otherwise.<sup>4</sup>

When doubt exists as to the cause of a pleural effusion, accurate diagnosis of the cause by biopsy with a Vim Silverman needle<sup>7</sup> or through direct incision<sup>8</sup> has been advocated as a diagnostic procedure. The two series in which pleural biopsy was done were composed of 45 patients and included a description of the method of pleural biopsy<sup>9</sup> and considerable information as to the pathology of pleurisy with effusion.<sup>8</sup> Both series stressed that only atypical cases warrant this procedure, more conservative diagnostic methods usually suffice. The proportion of nontuberculous to tuberculous pleurisy varied from 4/21 in one series to 2/24 in the other, all in the latter series initially being considered

From U. S. Air Force Hospital APO 994 San Francisco Calif. Dr. Berg is now at 59 Second Ave. New York 3, N. Y.

as probably tuberculous. The method of selection probably accounted for the difference in the above figures. Parenthetically in the second series, three cases were considered as due to tuberculosis because of the finding of acid fast bacilli in sputum or chest fluid, but at surgery no sign of specific infection could be found. In both reports the authors concluded that, in cases where the diagnosis is in doubt, pleural biopsy is a safe and effective tool.

Trauma, long known to be a cause of pleural reaction and effusion, is considered to exert its effect at the time of the traumatic event. Persistent pleural abnormality is considered a result of unresolved hemothorax. No mention can be found in the medical literature of chest wall injury giving rise to pleural reaction with effusion sometime after the traumatic event, though several mechanisms exist that may give rise to this sequence of events.

This report deals with two instances of pleural fibrosis with effusion ascribed to trauma that occurred six months and two years prior to the discovery of the pleural disease. Both were men in their thirties, both were treated in a hospital at the time of the trauma and both sustained rib fractures. One failed to demonstrate initially any signs clinically or radiologically of pleural reaction to the trauma; in the other patient a small amount of pleural fluid, thought to be hemothorax, had been completely absorbed by the time he was discharged at the end of the initial hospitalization. Several interval roentgenograms confirmed the absence of pleural reaction until the effusion appeared. Effusions in both patients developed in the area of maximum injury. Both were considered tuberculous, partially due to the report of acid fast bacilli in the sputum or gastric contents on single specimens. Finally, because of inconsistencies in the clinical pictures of both cases, thoracotomy was performed to resolve the diagnosis and coincidentally serve as a therapeutic maneuver.

### CASE REPORTS

Case 1. A 33 year old man was admitted to this hospital on 8 April 1955 for evaluation of a pleural effusion.

The patient had been perfectly well prior to 19 March 1952 (several routine roentgenograms being reported as negative) when he was severely injured in an automobile accident. His injuries included multiple fractures of the first five anterior ribs on the right as well as the sternum. A roentgenogram on the day of injury revealed only the rib fractures, but subsequently a pleural reaction was noted on the right as well as an atelectatic area in the right upper mid lung field. A roentgenogram 19 days later was similar, but by 2 June the reaction was much smaller. Films taken in September 1952 showed complete disappearance of these findings (fig. 1).



Figure 1 (case 1) Roentgenogram of the right side of the chest taken in September 1952. The healed fractures of the anterior portions of the right ribs may be seen. No pleural reaction is present. Figure 2 (case 1). Roentgenogram taken in October 1953. The patient complained of a cough. The density seen at the cardiophrenic angle was considered to be a patch of pneumonia.

In October 1953 he complained of a chronic cough and a roentgenogram taken at that time revealed an infiltrate along the right cardiac border (fig 2) He was treated with chlortetracycline hydrochloride (aureomycin) and the area was clear on subsequent films (fig 3)

In January 1955 he complained of wheezing Roentgenographic findings at this time were normal except for the healed rib fractures (fig 4) In February pain of a pleuritic type appeared in the right side of the chest A roentgenogram at this time showed reappearance of the paracardiac density on the right side and slight clouding of the costophrenic sulcus (fig 5) He was thought to have pneumonia but in April 1955 roentgenograms revealed blunting of the costophrenic angle (not seen in the previous film) and an area of discoid atelectasis in the right lower lobe (fig 6) At this time he was admitted to this hospital

Physical examination revealed only dullness to percussion and a few scattered crepitant rales over the lower right side of the chest posteriorly The temperature never exceeded 99.4°F and usually was normal

Complete blood cell counts were within normal limits The corrected sedimentation rate ranged from 25 to 32 mm/hr Cold agglutinin titers on at least six occasions were normal

Bronchoscopy revealed inflammation of both middle and lower lobe bronchi A biopsy of this area revealed only chronic inflammation A tuberculin skin test using first strength PPD was read as questionable and one using second strength PPD was strongly positive A thoracentesis yielded 65 ml of blood-tinged fluid A smear of this fluid was negative for tumor cells and acid fast bacteria the fluid was sterile for acid fast and pyogenic bacteria on culture Several sputum blood and urine cultures were negative for pathogens cultures of sputum for fungi were negative Eight sputum smears and cultures were obtained and were negative for acid fast bacteria however on 26 April acid fast bacteria were identified in a sputum smear and after seven days culture on blood media acid fast bacilli were noted This culture eventually proved to be a chromogenic organism nonpathogenic for the guinea pig On 27 April a gastric smear revealed acid fast bacilli These did not grow on culture media other gastric smears and cultures were negative

Serial roentgenograms revealed only minor changes in fluid level and a small pneumothorax after thoracentesis (fig 7) Clouding of the costophrenic sulcus on the right side was seen inconstantly on several films Fluoroscopy revealed pulsation in that area as well as restriction of the diaphragmatic excursion on the right A course of antibiotics failed to alter the roentgenographic picture because of the possibility of neoplasia he was referred to Fitzsimons Army Hospital for further study

Additional preoperative studies there revealed a vital capacity of 3.4 liters (78 per cent of the predicted value) Sedimentation rate was



4

Figure 3 (case 1) Roentgenogram taken one month after figure 2. The density previously noted in the costophrenic sulcus is no longer visible. Figure 4 (case 1) Roentgenogram taken in January 1955. At this time the patient complained of some shortness of breath. Both costophrenic and cardiophrenic angles are normal.

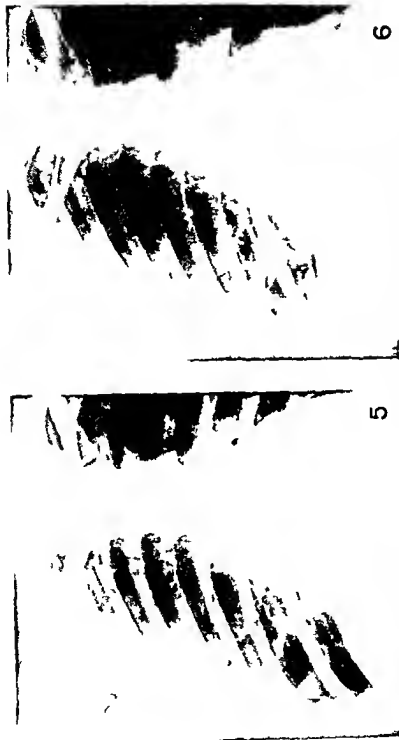


Figure 5 (Case 1) Roentgenogram taken seven weeks after figure 4. The patient complained of pleuritic pain in the right side of the chest. There is some clouding of the costophrenic sulcus and a more definite cloudiness in the cardiophrenic angle. Figure 6 (Case 1) The roentgenogram taken one month later than figure 5 shows considerable fluid in the costophrenic angle and an increase in the paracardiac density. The linear density of the fluid level was interpreted as an area of discoid atelectasis.



7



8

Figure 7 (case 1). Appearance of the right side of the chest in July 1933 approximately two weeks prior to thoracotomy. The pleural fluid in the costophrenic sulcus has resorbed although the paracardiac density persists. The area previously considered atelectatic has increased somewhat at exploration it proved to be pleural thickening Figure 8 (case 1). Bronchogram taken in the left oblique projection showing filling of the right middle lobe and illustrating the well filled but compressed bronchi that led to a preoperative diagnosis of "capture" of the right middle and lower lobes by pleural thickening.



11 mm/hr. Three gastric aspirations were negative for acid fast bacilli on smear and culture. Reaction to a tuberculin skin test using first strength PPD was positive. Skin tests for coccidioidomycosis and histoplasmosis were negative. Bronchoscopic examination revealed a small mucosal-covered 0.5-cm lesion in the region of the lateral wall of the right middle lobe bronchus obstructing about 10 to 15 per cent of the bronchial lumen. Biopsy of this area revealed only chronically inflamed bronchial tissue. Bronchial washings were negative on culture for acid fast bacilli.

Laminagrams confirmed the thickening of the pleura over the right middle and lower lobes. The right middle lobe was partially atelectatic as was the anterior basilar segment of the right lower lobe. A bronchogram revealed the right middle lobe bronchus to be closer together than normal but well filled. The basilar segments of the right lower lobe bronchus were only partially filled and some irregularity of the bronchial walls was noted (fig. 8). These results indicated that there was "capture" of the lower and middle lobe by thickened pleura. Treatment with penicillin and streptomycin sulfate was begun and a thoracotomy was performed.

The visceral and parietal pleura were adherent over the diaphragm, mediastinum and pericardium. The thickest part in the vicinity of the major fissure posteriorly and laterally was 1 to 2 mm thick firm and fibrous and was entrapping the middle and lower lobes. Over the pericardium a mass of fat was encountered adherent to the pericardium and diaphragm by thin fibrous adhesions. This was identified as omentum and was completely separated. Palpation in the vicinity of the foramen of Morgagni revealed a firm fibrous plug of omentum but no real defect in the diaphragm. About 95 mg of pleural peel was removed.

On microscopic examination it was noted that sections of the pleural peel contained fibrous connective tissue and a prominent chronic inflammatory reaction consisting of lymphocytes and plasma cells. Several scattered granulomatous lesions containing multinucleated giant cells were seen. Neither caseation nor acid fast bacilli were found in any portion of the specimens. The final pathologic diagnosis was non specific pleuritis.

The postoperative course was uneventful. A postoperative roentgenogram revealed some fluid at the right base which was gradually absorbed. The right costophrenic angle remained obliterated. The patient was discharged without further therapy to full duty. Six months later he was still active and completely asymptomatic.

**Case 2.** A 35 year-old man was admitted to this hospital for the second time on 3 September 1955 for evaluation of a pleural effusion.

In December 1954 the patient fell from a considerable height fracturing several left posterior ribs. He was admitted to the hospital complaining of severe pleuritic pain in the left side of his chest and fever.

Roentgenograms, however, revealed no pleural or pulmonary lesions and he was discharged asymptomatic after nine days of rest and antibiotic therapy (fig 9). He was completely asymptomatic thereafter. In July, he reported for an annual physical examination. Both physical and radiologic evidence of left pleural fibrosis and effusion were noted (fig 10) and after preliminary outpatient study he was admitted to the hospital. The blood cell count was within normal limits and a urinalysis, serologic test for syphilis and skin tests for tuberculosis, coccidioidomycosis and histoplasmosis were negative. Thoracentesis on the fourth hospital day produced only 10 ml of clear yellow fluid containing 1,100 lymphocytes per  $\mu$ l and 3.99 grams of protein per 100 ml. The fluid was sterile. A second thoracentesis 12 days later produced 100 ml of a similar fluid. In both cases, loculation of the fluid was believed to be present. The sedimentation rate varied from 17 to 33 mm per hr. Several sputa and gastric analyses were negative for acid fast bacteria by smear and culture. However, one sputum specimen, obtained six days before operation, contained acid fast bacteria on smear and culture. A guinea pig inoculated from this sputum survived. Autopsy failed to reveal evidence of tuberculosis.

Roentgenograms revealed minor variations in the extent of the effusion (fig 11). At no time was a parenchymal lesion seen. Films made with the patient in decubitus and upright positions were almost identical, suggesting that most of the density represented pleural fibrosis rather than effusion. At fluoroscopy, the left diaphragm was somewhat limited in excursion. Roentgenograms of the gastro-intestinal tract, skeleton and kidneys were normal.

The patient was completely asymptomatic and afebrile all through the period of investigation, during part of which he was returned to limited duty. A total of seven skin tests for tuberculosis utilizing second strength PPD were performed, all were negative. He gained approximately 12 pounds while in the hospital. Biopsy of the pleura with a Vim-Silverman needle was attempted; the specimen contained only skeletal muscle and fibrous tissue. The fibrous tissue was infiltrated with lymphocytes arranged perivascularly but was not identifiable as pleura.

Thoracotomy revealed a thickened pleura over the left lower lobe without obliteration of the pleural space. The lung was normal to palpation. Approximately 60 ml of thin clear fluid was present. Surgical decortication was performed. Microscopic examination of the peel revealed only fibrous tissue with some minor inflammatory reaction (fig 12). The pleural fluid was sterile on culture for acid fast bacilli. The postoperative course was uneventful; the patient returned to full duty within 45 days and was completely well 1 year later. He engages in relatively strenuous physical labor.

#### COMMENTS

It is not suggested that this report in any way controverts the current concept that tuberculosis is the cause in almost all

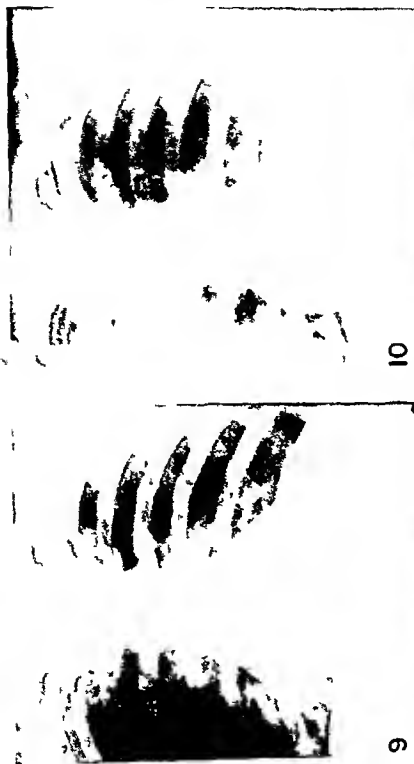


Figure 9 (case 2) Roentgenogram of the chest taken immediately after the patient had fallen and fractured the left ribs and tenth ribs posteriorly (hidden by the diaphragmatic shadow). The costophrenic angle was normal. Figure 10 (case 2) Roentgenogram taken approximately six months after figure 9. There is now a left pleural effusion with pleural thickening.

idiopathic pleural effusions. However, pleural effusions complicate many diseases.<sup>3, 10, 11</sup> Occasional cases of pleurisy with effusion are seen, due to various causes, which either cannot be diagnosed by the usual means or are confused by false positive bacteriologic information. In the series of Stend, Eichenholz, and Stauss,<sup>8</sup> chronically active organizing pneumonia, prior spontaneous pneumothorax or hemopneumothorax, and histoplasmosis were the basis of effusions. Their experience with false positive bacteriologic tests for acid fast bacilli has previously been mentioned.



*Figure 11 (case 2) Roentgenogram taken a few weeks before operation. The pleural effusion has decreased slightly. No parenchymal lesion is seen.*

We believe that prior trauma to the chest wall should be added to the list of causes of pleurisy with effusion. Neither remoteness of the trauma in terms of months to a few years, nor absence of pleural reaction at the time of injury eliminate trauma as a cause of the lesion. While it is difficult to draw conclusions from only two cases, some clinical support may be obtained for the diagnosis when a history of trauma is obtained. Our experience re-emphasizes the value of the tuberculin skin test.<sup>3</sup> Tuberculous pleurisy with effusion is thought to be a consequence of either

rupture into the pleural cavity or contiguous inflammation. In the tuberculin sensitive person the pleural reaction leads to a considerable exudation of fluid and dilution of organisms to a point where smears and cultures will appear sterile. Absence of tuberculous sensitivity, evidenced by negative skin reactions, would make this sequence unlikely. Where the problem has been investigated conversion of the skin reaction from negative to positive has preceded the appearance of pleural effusion by six months.<sup>12 13</sup>



Figure 12. Section of pleural peel removed at thoracotomy. It consists almost entirely of fibrous tissue with but a minor inflammatory component ( $\times 130$ ).

The presence of a relatively small effusion and a considerable degree of fibrosis especially early in the course of the disease demonstrated clinically by only small amounts of fluid available at thoracentesis and only minor changes in configuration in roentgenograms made with the patient in decubitus position also suggests a nontuberculous cause. Stead, Eichenholz and Stauss suggested laminagraphy as a means of demonstrating subpleural nodules; the absence of these may be added to other evidence in making a clinical diagnosis. Study of the pleural fluid sugar or beta glucuronidase levels have also been mentioned as of diagnostic value.<sup>14 15</sup> Finally where doubt exists the pleural biopsy would seem preferable to empirically treating the patient for tuberculosis. This procedure can be performed through a small incision without most of the sequelae of major chest surgery.<sup>9</sup> Pleural

biopsy with a Vim Silvermann needle,<sup>7</sup> attempted in case 2, did not result in adequate tissue for a diagnosis.

The mechanism of the late development of pleural fibrosis and effusion after trauma is speculative but some comments can be made. In case 1 the presence of herniated omentum probably acted as a stimulus for continued pleural reaction. In addition, pleural fluid had been present in this area shortly after the initial trauma but was completely absorbed during convalescence. The pleural peel was thickest over the major fissure, posteriorly and laterally, and presented the histological picture of a foreign body reaction. In case 2, no herniation was present, pleural laceration or hemothorax may have appeared following discharge from the hospital. The complete absence of any symptoms during this period makes this unlikely; however, it is more likely in both cases that radiologically invisible pleural inflammation remained after the acute traumatic phase apparently subsided. This inflammation may have excited further fibrosis. Continued fibrosis after inflammation analogous to keloid formation has been postulated as being the cause of masses of fibrous tissue in the pleura that have been labeled "pseudotumors."<sup>8</sup> Although this sequence usually follows an infectious disease, a similar pattern may occur with trauma and rib pleural injury.

Once a considerable degree of fibrosis is present, fluid formation is explainable. Stead and his group encountered seven instances of what they referred to as "trapped lung" in a group of nine patients with nontuberculous pleurisy with effusion who were subjected to thoracotomy. They found that the lower portion of the lung was encased and compressed by a thin, tough fibrous peel. There was no pleural symphysis. The upper lobe, also covered by thickened pleura, could not fill the space left by the compressed lower lobe. As a consequence, fluid was drawn into the pleural space to restore normal pressure relationships. In case 2, a mechanism similar to this certainly existed. Both pleurae were thickened although there was no obliteration of the pleural space. In case 1 lung trapping was suggested preoperatively by the compression of the bronchi as seen on bronchogram. Further, at exploration the surgeon noted that the fibrous peel entrapped the middle and lower lobes to a significant degree. Despite removal of 65 ml of fluid by thoracentesis four months before, the pleurae were adherent, and no fluid was reported at operation. Apparently, continuation of the fibrosing process obliterated the necessary space.

Finally, it is interesting to mention briefly our experience with the reports of positive smears and cultures for acid fast bacilli. In one case a simple chromogenic organism was involved. Case 2 is much more complex. Here a single smear and culture were positive. Although a guinea pig inoculated with a concentrate of the

material survived without change in reaction to the skin test, another animal inoculated with the organism obtained from the culture died and autopsy revealed typical tuberculous lesions. Further study however revealed that the organism was resistant to streptomycin sulfate, para aminosalicylic acid and isoniazid, although the patient in question had received no therapy at that time. At the same time, the laboratory was processing a culture slant obtained from another patient previously treated and containing an organism with identical cultural reactions and sensitivities. In view of the persistently negative tuberculin test the absence of parenchymal disease to palpation and inspection at thoracotomy and the nonspecific histological picture of the pleura cross contamination in the laboratory seems likely. The experience of others with reports of acid fast bacilli in body fluids later contradicted by the operative findings has been alluded to previously. The opportunity for error is present in a situation like that of most small military hospitals where relatively untrained personnel collect and label specimens and where such specimens must be shipped to a laboratory receiving and processing collections from many different areas. In addition cross contamination is a possibility in the laboratory itself. The bacteriologic finding then must be carefully evaluated in the light of the clinical picture and associated tests. Where these are contradictory the possibility of incorrect bacteriologic information must be considered.

#### SUMMARY

Tuberculosis is undoubtedly the cause of the vast majority of "idiopathic" pleural effusions. However severe chest wall trauma may be a cause of some of the remainder. When a history of such an injury is obtained the clinical and laboratory data must be especially carefully scrutinized for evidence of nontuberculous cause of the effusion. Where doubt exists resolution of the dilemma by pleural biopsy would appear to be preferred to an empirical therapeutic regimen for tuberculosis.

In two patients with pleural effusion following trauma by months to years partially because of false positive bacteriologic reports and in part because of normal interval roentgenograms tuberculosis was considered the diagnosis of choice. Contradictory findings led to exploration of the chest with examination of the lung pleural biopsy and finally decortication. In both no evidence of tuberculosis was found and the fibrosis and effusions were ascribed to the trauma. The mechanism of delayed post traumatic pleural effusion is unknown but it is likely that radiologically invisible pleural inflammation remains after the acute traumatic phase subsides. This inflammation may produce increasing pleural fibrosis which compresses encases and traps the lung. As a consequence fluid is drawn into the pleural space to restore normal pressure relationships.

## REFERENCES

1. Fisher, T. H. and Varley, J. J. Primary spontaneous pleural effusion in military personnel. *Am. Rev. Tuberc.* 76: 62-64 May 1957
2. Sisson, J. T., and Smiley, G. T. Cause of bluish discoloration of pleural effusion in 10 patients. *Am. Rev. Tuberc.* 77: 647-61 Nov 1957
3. Fells, A. Pneumonic significance of pleural effusion. *Dis. Chest* 15: 42-44 Dec 1948
4. Strömstedt, E. *Undersökningar över den Tjyngsalskilda Primära Exsudativa Pleuritis Färga med särskild Hänsyn till dess Färg och Etsa. Meddelande Förlag. Copenhagen, Förl. C. 1948* in reference 8
5. Rogers, E. and Postma, M. Pleural effusion: then incidence and its significance as shown in studies in a Los Angeles General Hospital, 1911-1944. *Dis. Chest* 27: 10-12 Feb 1954
6. Fisher, E. H. Diseases of the Chest Text Emphasis on X-Ray Diagnosis. T. B. Saunders Co., Philadelphia, Pa., 1947 - 348
7. DeWitt, A., Kish, E., and Allen, E. New's history of pleural effusion. *New Eng. and J. Med.* 276: 948-49 June 2 1957
8. Ström, T. E., Eichenlaub, A., and Ström, H. K. Chronic and subacute pleuritis in 24 patients with evidence of pleural effusion with effusion, pleural thickening, and pleural adhesions. *Am. Rev. Tuberc.* 77: 474-84 Apr 1957
9. Smith, T. D., Fisher, F., and Price, M. L. Pleural history. *Dis. Chest* 26: 13-15 Nov 1954
10. Leavitt, E. C., and Carr, D. T. Pleural effusion: a review study of 436 cases. *New Eng. and J. Med.* 255: 72-73 Jan 19 1956
11. Wilson, J. B. Some diagnostic features of pleural effusions. *Am. Pract. & Digest* 7: 234-237 Apr 1952
12. Ewald, P. V., Petros, A. C., and Blair, L. G. Primary tuberculous infection in children and adolescents and supervision. *Lancet* 1: 427-431 Apr 1949
13. Isaac, H. L., and Long, E. R. Primary tuberculous infection in adolescents and young adults. *Am. Rev. Tuberc.* 41: 42-51 Jan 1948
14. Gerson, A. M., and Tupper, R. F. Pleural effusion of pleural fluid sugar in tuberculous pleuritis. *Dis. Chest* 15: 325-328 Mar 1948
15. Lawrence, S. H. Use of bovine serum albumin as measure of pleural irritation. *Dis. Chest* 24: 72-74 July 1953
16. Brown, T. J., and Jackson, L. C. Pleuritis by "tumors" of pleura: 3 cases of pleural fibrosis of interlobar fissure. *N.Y. Surgeon* 179: 4-6 Oct 1944



# A PANORAMIC X-RAY DENTAL MACHINE

DONALD C. HUDSON *Colonel USAF (DC)*

JOHN F. KUMPULA

GEORGE DICKSON *MA*

**T**HE NEED for a simple and rapid method of recording dental conditions of large numbers of people has existed in the armed services for some time. Such records are particularly desired on persons entering the services to provide evidence of the general dental health level of the subject and information on dental treatment requirements during the service life of the individual and to aid in establishing identification records.

Present methods in which intraoral films are used require the placement and exposure of 14 or more films. This creates a time-consuming problem in processing and handling and fails to show pathologic conditions lying outside the field covered by the small films.

Several methods for producing full mouth dental x rays on a single film both intraorally and extraorally have been explored. Smathers,<sup>1</sup> Nelsen and Kumpula,<sup>2</sup> Zulauf,<sup>3</sup> Paatero,<sup>4</sup> and Blackman<sup>5</sup> have produced such radiograms using machines of various designs.

Development of a dental x ray machine designed to produce full mouth radiograms on single 5 by 10 inch films was undertaken at the National Bureau of Standards Dental Research Laboratory. The program has been carried on in co-operation with the U. S. Air Force Dental Service and the U. S. Air Force School of Aviation Medicine.

An extraoral method termed curved surface laminagraphy was selected for the present development because of the simplicity of the technic and the fact that fitting and placement of a bulky lead backed film in the patient's mouth would not be required. It was also decided that rotation of the x ray source and film holder would be employed rather than rotation of the patient and chair as described by Paatero,<sup>4</sup> thus further simplifying the apparatus.

---

From Dental Research Section, National Bureau of Standards, Washington, D. C.   
Walter C. Hudson was Guest Worker Mr. Kumpula, Laboratory Mechanical Division,   
Office of Physical Research.

Colonel Hudson now at School of Aviation Medicine, Randolph Air Force   
Base, Texas.

## METHOD

The principles of curved surface radiography have been discussed by Pantero<sup>1</sup> and by Duhamel.<sup>2</sup> The essential condition for this type of radiography is that the shadow or image of the object that passes through a beam of x rays must fall on a film that is moving at the same velocity as is the image. Pantero has shown that the synchronization of image and film in dental radiography can be obtained by rotating in opposite directions the subject and a film curved to the shape of the dental arch. In the panoramic machine described in this report, synchronization of image and film is obtained by moving a flat film by means of a cable passing around a cam shaped to simulate the curve of the dental arch.

The present form of the panoramic machine was adopted after preliminary studies were made to determine geometric relationships and factors influencing projection of images of the dental mouth structures. In one device, a light beam was employed rather than x rays, and transparent plastic models of the dental arches containing opaquely outlined tooth silhouettes were used. Photographic printing paper was substituted for film. Information gained in the above experiment was applied to the design of another panoramic device using an x ray source and a human skull. This model did not provide for movement of the x ray source due to the bulk and weight of the x ray tube head. The subject (skull) was rotated and the film holding device rotated to achieve the same geometric pattern as had been obtained in the light beam model. Many radiograms were made with this device, using different x ray exposures, different rates of motion, different positions of subject, film, and x ray source, and various widths of x ray beam. Information gained was used in the design of the machine that represents the final development achieved in this project to date.

In the final form of the machine, shown schematically in figure 1 and photographically in figure 2, the x ray source and film holder are rotated around the subject so that the axis of rotation  $R$ , is just medial to the angle of the mandible on the side opposite to that to be radiographed. The rate of linear motion of the x ray beam as it sweeps the dental arch varies with the changes in curvature of this arch. Molar and bicuspid teeth, for example lie on the circumference of a circle whose radius,  $r_1$ , is slightly shorter than that of a circle whose circumference passes through the incisor and cuspid teeth, the center of both circles being located at the center of rotation previously described. Therefore the linear rate of motion of the film past the vertical slit,  $U_1$ , in the face of the film holder must be slightly increased when projecting the anterior teeth as compared to the linear rate when projecting the posterior teeth. This variable rate is provided by the cam of the film drive mechanism.

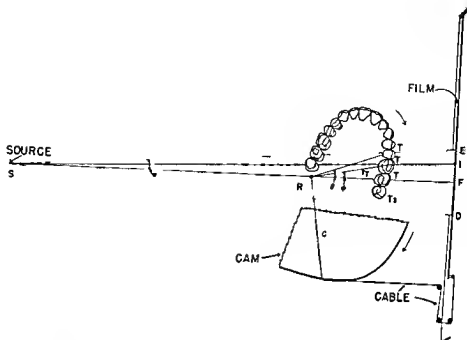


Figure 1 Schematic diagram of panoramic x ray machine



Figure 2 Panoramic x-ray machine

Curvature of an average dental arch is simulated in each of the four lobes of the cam, and its contour is proportioned so that the proper rate of movement of the film past the film housing vertical slit is maintained by the endless cable which passes around the cam and is attached to the film cassette. The result is a projection of those dental structures lying on the curved surface described by the dental arch, while structures lying outside or inside this surface are projected in such distorted and diffuse shadows that they do not interfere with the visualization of the structures to be radiographed. Since the divergence of the x ray beam produces a slight magnification in the image, the over all rate of the film movement dictated by the size of the cam must be slightly greater than the rate of linear motion of the x ray beam along the line of the dental arch.

The method by which the panoramic image is obtained is shown schematically in figure 1. The diagram shows the arrangement for exposing one half of the arch. After this half is exposed, the subject is moved laterally so that the axis of rotation is back of the molars on the opposite side of the arch, the source and film holder are repositioned, and the second half of the arch is then exposed. In practice the subject and cam remain in a fixed position during the exposure while the source and film holder are rotated around them. In principle this is identical to holding the source and film holder fixed and rotating the subject as shown in figure 1. From this figure it can be seen that a clear image of T can be obtained only if the film moves so that at all times point I is on the extension of a straight line from the source S through T as T moves through the x ray beam (from T<sub>1</sub> to T<sub>2</sub> to T<sub>3</sub>). This condition will be met if

$$\frac{FI}{SI} = \frac{r_T \sin \phi}{SR + r_T \cos \phi} \quad 1$$

where  $\phi$  is equal to or less than  $90^\circ$ . Since  $\phi$  is small it can be assumed that  $\cos \phi = 1$  and  $\sin \phi = \phi$ . Equation 1 therefore can be written

$$\frac{FI}{SI} = \frac{r_T \phi}{SR + r_T} \quad 2$$

Using this relation, the dimensions of the cam required to control the movement of the film can be determined. The angular velocity  $\omega$  of a point T moving through the x ray beam from T<sub>1</sub> to T<sub>2</sub> in time t is  $\omega = \frac{\phi}{t}$  3

and the linear velocity is

$$\omega r_T = \frac{r_T \phi}{t} \quad 4$$

Assuming that the linear velocity  $V_I$  of the image across the slit is constant, from equation 2

$$V_I = \frac{FI}{t} = \frac{SF r_T \phi}{(SR + r_T)t} \quad 5$$

Substituting from equation 3

$$V_I = \frac{SF \omega r_T}{SR + r_T} \quad 6$$

If the velocity  $V_F$  of the film is controlled by a cable around a cam also moving with angular velocity  $\omega$  the linear velocity of the film is  $V_F = \omega r_C$  where  $r_C$  is the effective radius of the cam when  $T$  is passing through the x-ray beam

For image formation  $V_F = V_I$  or

$$\omega r_C = \frac{SF}{SR + r_T} \omega r_T \quad 7$$

$$r_C = \frac{SF}{SR + r_T} r_T \quad 8$$

This equation gives the required effective radius  $r_C$  at any point on the cam to provide a sharp image of any point  $T$  on the subject at a distance  $r_T$  from the axis of rotation. In the design of the actual cam the geometry of the machine and of the cam, which affects the point of contact of the cable and the cam must also be taken into account.

A point,  $T_\delta$  at a distance  $r_T + \delta$  from the axis of rotation will project a line rather than a point on the film as it passes through the x-ray beam. The length,  $\Delta$  of this line which determines the sharpness of the image can be calculated by comparing the relative positions of the film and image when the image of point  $T_\delta$  is at  $F$  and when the image of this point is at the edge of the slit.

When the image,  $I_\delta$  of point  $T_\delta$  is at the edge of the slit

$$\frac{(r_T + \delta) \sin \phi}{SR + (r_T + \delta) \cos \phi} = \tan \alpha \quad 9$$

Considering  $\cos \phi = 1$  and  $\sin \phi = \epsilon$  since  $\phi$  is small

$$\epsilon = \frac{(SR + r_T + \delta) \tan \alpha}{r_T + \delta} \quad 10$$

The distance  $l l_\delta$  when  $l_\delta$  is at the edge of the slit, can be written

$$l l_\delta = S l \tan \alpha \quad 11$$

Since  $l_\delta$  and  $l$  will both fall on  $l$  when  $\epsilon = 0$  and since the movement of the film is synchronized with the movement of  $l$  the length  $\Delta$  of the projection of  $l_\delta$  on the film is equal to the distance between  $l_\delta$  and  $l$  when  $l_\delta$  is at the edge of the slit from equation 2

$$F l = \frac{S l r_T \epsilon}{SR + r_T} \quad 12$$

Substituting from equation 10

$$l l = \frac{S l r_T (SR + r_T + \delta) \tan \alpha}{(SR + r_T)(r_T + \delta)}$$

$$\Delta = F l_\delta - F l =$$

$$\frac{S l \tan \alpha (SR + r_T)(r_T + \delta) - S l r_T (SR + r_T + \delta) \tan \alpha}{(SR + r_T)(r_T + \delta)}$$

$$\Delta = \frac{S l SR \delta \tan \alpha}{(SR + r_T)(r_T + \delta)} \quad 13$$

From this equation it can be seen that the sharpness of an image at a distance  $\delta$  from  $r_T$  is proportional to  $S l \tan \alpha$ , which is one half the slit width. Thus, the importance of the slit width in determining the sharpness of the image is apparent. The slit must be narrow enough to provide sharp images of the structures of the dental arch and at the same time must be wide enough so that the shadows of structures not on the dental arch will be blurred to such an extent that they do not interfere with the desired images.

The length on the film of the image of a point at a distance  $r_T + \delta$  from the center of rotation can be calculated by substituting numerical values in equation 13. The approximate values for the present panoramic x ray machine are as follows

SF	425 mm
SR	298 mm
RF	127 mm
$r_T$	50 60 mm
FE	3 75 mm
$\tan \alpha$	0 00882

Substituting in equation 13 and assuming  $r_T = 55$  mm values for  $\Delta$  can be determined. Since the equation gives the value for image movement from the center to the edge of the slit, the total length of the image is equal to  $2 \Delta$ . Calculated values are given below

$\delta$	$2 \Delta$
1 mm	0 11 mm
5 mm	0 53 mm
10 mm	0 97 mm
-10 mm	-1 41 mm

### PROTOTYPE MACHINE

**Construction** As now constituted, the panoramic dental x ray machine is shown in figure 2. A Fischer Model AN<sup>1</sup> bedside radiographic machine base controls and self contained tube head transformer combination were incorporated in the new device. The x ray source and film holding mechanism are suspended from a movable arm which pivots about an axis secured to a large fixed horizontal support arm extending out from the main support column.

A reversible motor with reduction gearing is coupled through a magnetic clutch to a pulley and belt system to drive the movable arm about the support axis. Movement is controlled by mechanical stops permitting about  $200^\circ$  of total rotation, and a reversing switch automatic stop device which automatically stops the machine at the end of one half arch exposure and reverses polarity to the motor as the machine is moved by hand to the opposite side for the second half arch exposure.

Immediately below the axis of rotation is a four lobed cam which with its cable drive moves the film inside the holder at the proper rate to secure exposure of the desired structures.

Regular medical x ray film is placed in a cassette with intensifying screens and inserted into the film carriage in the film holding element of the machine. The carriage is constructed to roll on a horizontal track inside the film holder so that the entire

film can pass a vertical slit in the center of the top face of the film holder housing. This face which is toward the x-ray source is lined with lead and only those x-rays passing through the vertical slit can reach the moving film. Exposure of the entire radiation is reduced in this manner.

X-rays emerging from the source carried at the end of the movable arm opposite the film holder are confined by a vertical lead slit so that a narrow vertical beam is projected. This beam passes directly through the subject and falls on the opposite face of the film holder. Objects in the beam cast sharp shadows on the film in proportion to their relative size as they are as is the case in all x-ray exposures.

**Operation** The subject is seated and his head is positioned by means of a chin rest so that the axis of rotation of the machine falls at a point just medial to the angle of the mandible on the side opposite that to be radiographed. The head is tilted slightly forward so that basal skull shadows will not fall in the area of the teeth but will be projected higher on the film where they will not obscure detail in the dental structures.

The movable arm is swung to the extreme limit of its travel so that the film holder is now near the teeth and jaws of the side to be radiographed. The machine is energized and the x-ray beam sweeps about the rear of the head, from about the posterior border of the ramus of the mandible on the side opposite that being radiographed to a point just lateral to the vertebrae of the neck. At the same time the film holder has moved from its position at the start of the exposure, near the molar tooth region, to a position near the incisor teeth of the side of the dental arch being radiographed. Following this, the patient's head is moved to repeat the opposite side of the arch, the machine is swung manually about its axis to reposition the x-ray tube and film holder, the machine is again energized, and the second half arch is exposed.

Time required totals 40 seconds for the two exposures and it is anticipated that, once the technique for using the machine is perfected, an experienced operator should be able to take full mouth radiographs in three to five minutes.

Adequate density has been obtained in adult human dental radiographs using x-ray tube voltage and current of 65 kv. at 10 milliamperes. Patient radiation at various points in and about the head is reduced in this method of radiography due to the fact that a narrow beam of x-ray is used and repeated exposure of the same area does not take place as it does in conventional dental radiography.<sup>10</sup>

## RADIOGRAPHIC RESULTS

Radiograms of the entire dentition as well as the body and ramus of the mandible and the bony structure of the mandible and





Figure 3 Reproduction of 11 month survey

maxillary regions are produced (fig. 7). The presence of impacted or unerupted teeth or retained roots is shown and the general status of the alveolar bone is revealed. Fillings, bridges, etc., are shown, as in earlier roentgenographic techniques. If the canal has occurred. Information recorded in films is sufficient to establish many facts of value in many instances for specialized applications in prosthetic and surgical diagnosis. If further detailed spot films are required, these can be made as needed. The panoramic machine is not designed to supplant the conventional technique where the recording of extreme detail is necessary.

### SUMMARY

A panoramic dental x-ray machine for use in panoramic examinations has been developed and a prototype constructed. This device produces full mouth dental radiographs on a single 5 by 10 inch film using an external technique. Patient is positioned either seated or standing, beneath the moving arm of the machine, which carries an x-ray source and film holder. Rotation of this arm about its axis sweeps the x-ray source and film along the patient's head, producing a projection of the dental teeth images on the moving film. An exposure time of approximately 15 seconds is required for each side of the arch. Adequate detail is secured to obtain a diagnosis of general mouth conditions. The panoramic dental x-ray device is not designed to supplant the conventional dental x-ray machine in cases where extreme sharpness and detail must be obtained.

### REFERENCES

1. Sathers H. U. S. Pat. 1,241,700.
2. Nelson R. J. and McClellan J. W. *Exposure of Radiographs by X-ray*. Vol. 1, 158-165. Apr. 1952.
3. Zulauf A. F. U. S. Patent 1,475,559.
4. Paatero Y. A. *Photo-panoromography by theoretical study for dental radiography and panoromography by* *Scand. Radiat. Technol.* 45 (5-6): 1-10, 1955.
5. Paatero Y. A. *Panoromography in theory and practice*. *Acta Radiol. Scand.* 41: 1-155. Apr. 1954.
6. Paatero Y. A. U. S. Patent 2,654,446.
7. Blackman S. *Mass dental radiography by radiology*. 23: 21, Feb. 1954.
8. Duhamel J. *Les Procédés de Radiographie en Courbe*. *Con. Hippocrate Sc. Ind. Photo.* 25: 129, 1954.
9. Duhamel J. *Une Forme Nouvelle de Radiographie*. *Sc. Ind. Photo.* 25: 153, 1954.
10. Hudson D. C. and Jampula J. W. *Ionization chambers for radiation data from dental x-ray exposure*. *U. S. Armed Forces M. J.* 113: 1135. Aug. 1955.

# TECHNIC OF CREMASTER MUSCLE DISSECTION IN INGUINAL HERNIOPLASTY

FELIX P. BALLENGER *Captain MC USA*

**T**HE PROPER method of dissecting the cremaster muscle when performing inguinal hernioplasty has been little discussed yet in many cases it presents a real problem if an adequate repair is to be accomplished. In performing inguinal hernioplasties, and also when observing other surgeons performing this operation, I have noted difficulty in accurately suturing the fascia of the transversalis muscle to the shelving border of the inguinal ligament about the spermatic cord at the internal inguinal ring when the usual methods of dissection of the cremaster fibers were used. If the cremaster fibers are split in the line of their descent or if they are allowed to continue to encircle or cover the cord structures in any manner they will invariably obstruct the proper placement of sutures about the spermatic cord at the internal inguinal ring.

## OPERATIVE TECHNIC

In order to avoid the difficulties created by the presence of the cremaster muscle in this part of the repair, I have developed a technic for dissection in this region which completely removes the obstructions caused by the cremaster fibers and also in cases of recurrent hernia and large hernia obviates excision of the cremaster in order to accomplish adequate repair. The following technic for dissection and repair of an inguinal hernia is therefore recommended as I have used it in a large number of cases with invariable ease of suture placement and excellent results.

1 The usual inguinal skin incision is made

2 The external oblique fascia is incised and opened in the line of its fibers into the apex of the external inguinal ring. This incision is carried about one and one half inches above the internal abdominal ring and well down over the pubic tubercle in the external spermatic fascia.

3 The cremaster fibers are dissected free from the inguinal ligament from the pubic tubercle to one inch above the internal

abdominal ring (fig. 1) It is important in this dissection to see that all fibers are completely detached from the inguinal ligament.

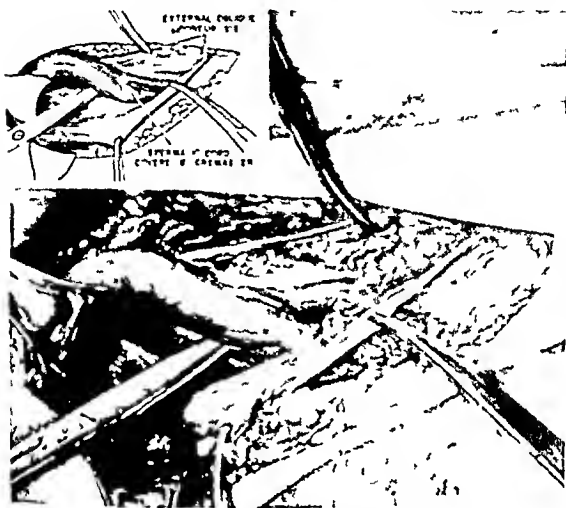


Figure 1 Beginning the dissection of the cremaster muscle. The point of the scissors is shown under the lower edge of the cremaster at this site the cremaster is detached from its origin.

This lower border of the cremaster is then elevated and the dissection continued to elevate the cremaster muscle in its entirety from the external spermatic fascia and underlying cord (fig. 2). The entire cremaster, including its origin from the internal oblique muscle, is then retracted upward. This exposes the spermatic cord covered by the internal spermatic fascia (fig. 2).

4 The spermatic cord and its internal spermatic fascia covering can then be dissected completely free from the floor of the inguinal canal from the internal abdominal ring to a point below the pubic tubercle. When this has been accomplished all areolar tissue is removed from the inguinal canal and its floor (fig. 2).

5 The internal spermatic fascia is then incised in a line with the spermatic cord and the hernia sac can easily be brought up, dissected out completely, its neck transfixed and ligated high inside the internal abdominal ring, the sac excised, and the stump

allowed to retract upward. If however, a direct hernia sac is present, it can be handled by whatever method seems appropriate, such as dissection, high ligation, and excision or by imbrication and infolding.

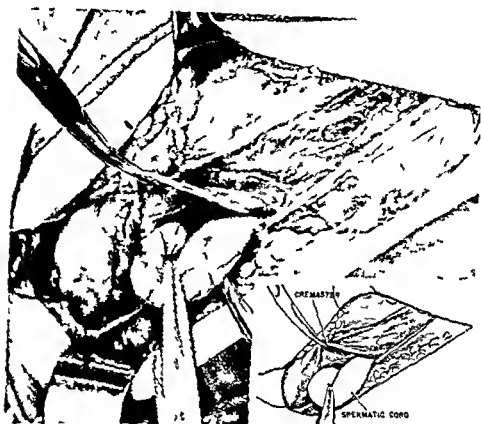


Figure 2 The cremaster has been elevated from the cord and the cord dissected from the floor of the inguinal canal.

8 After the sac or sacs in the case of a "Pantaloon" type have been adequately removed or imbricated, the repair can then be proceeded with. The transversalis fascia is secured in the floor of the inguinal canal with Allis forceps and the border of the transversalis fascia is sutured to the shelving border of the inguinal ligament with interrupted No 00 cotton sutures (fig 3). The sutures are placed from the medial angle lateralwards being certain to secure the first suture into the fascia overlying the pubic tubercle. As placement of the sutures upward and outward proceeds it becomes obvious that they can be placed on either side of the spermatic cord at the internal abdominal ring with ease without incorporating fibers of the cremaster muscle because the cremaster and internal oblique muscles are now being retracted upward completely out of the way (figs 3 and 4). By placing 6 to 8 sutures below and medial to the cord and 2 or 3

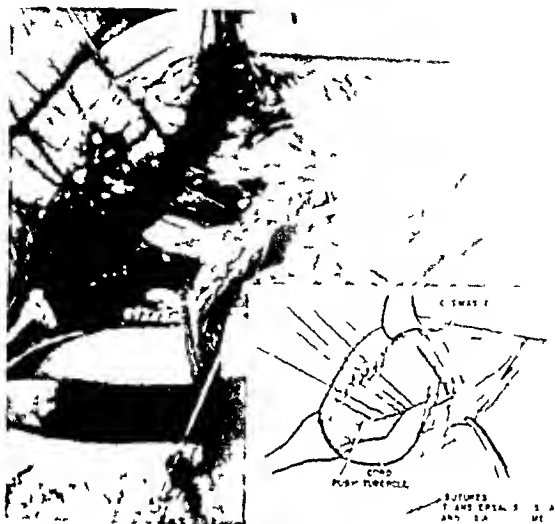
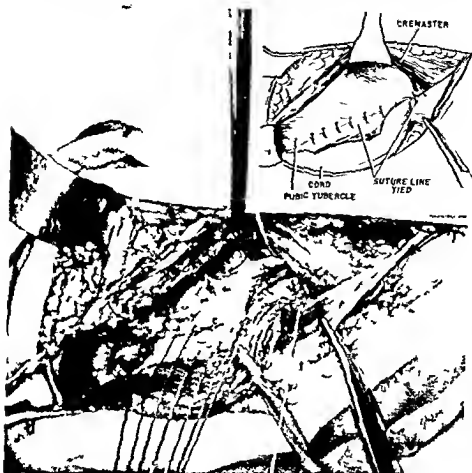


Figure 3 Retraction upward of cremaster muscle permits easy placement of sutures in transversalis fascia and inguinal ligament

above or internal to it, a snare repair around the spermatic cord usually can be obtained. In infants and children this layer of repair is not necessary and is omitted. I believe that many recurrences of indirect inguinal hernias occur because of inaccurate placement of sutures and failure to secure an adequate, snare repair about the spermatic cord. This defect can easily be avoided by using this technique of dissecting the cremaster and repairing the floor of the inguinal canal.

7 The spermatic cord is then replaced in the inguinal canal and the cremaster replaced over the cord and sutured to the inguinal ligament in its normal anatomic relationship (fig 5). However, if it is thought desirable the cord can be transplanted completely to the subcutaneous tissues in the Halsted repair. If the cord is replaced in the canal and the cremaster sutured over it as above described the external oblique fascia and external spermatic fascia are then closed with interrupted No

0000 cotton sutures and the subcutaneous tissue and skin closed with the same material. If the Halsted procedure is done the external oblique fascia is sutured beneath the spermatic cord.



*Figure 4. All sutures have been tied apposing the transversalis fascia to the inguinal ligament*

allowing the cord to emerge through this suture line at a point about one half to three fourths inches lateral to the internal abdominal ring. A bed of subcutaneous tissue is then sutured underneath the cord between it and the external oblique fascia and subcutaneous tissue and skin are closed over the cord, using No. 0000 cotton sutures throughout.

#### SUMMARY

A technic for dissecting the cremaster muscle from the external spermatic fascia and spermatic cord and retracting it upward along with the internal oblique muscle allows easier placement



Figure 5 The cremaster has been in tonic position and is shown here inguinal ligament

of sutures in the transversalis fascia. This technic obviates the incorporation of a suture above and lateral to the spermatic cord and makes a more accurate and stable repair of the inguinal canal floor.

This article is reprinted from the November 1955 issue of this Journal. Because of a printing error had robbed the illustrations of some of their effectiveness in giving the reader a clear understanding of the important new technic described.—Editor



# THE PASSIVE-AGGRESSIVE PERSONALITY

RICHARD G SINGER *Lieutenant Commander MC USNR*  
CHRISTOPHER C SHAW *Captain MC USN*

**A**LTHOUGH the passive-aggressive individual is not well described in the psychiatric literature he is encountered with considerable frequency at military sick call. This chronic complainer presents knotty problems in medical administration and his treatment and disposition provoke considerable tension. Before enlarging on the nature of these difficulties and presenting suggestions for the management of the recalcitrant patient, a brief review of the features of this character disorder is in order.

According to Hodge: "The passive aggressive character is the man you don't like." This is the ideal summation. The unpleasantness of this type of personality prompted H. G. Wells to refer to such people as "common humanity unmitigated." They are chronic complainers who imply that their medical problems are largely unappreciated and that the physicians have acted in a thoroughly incompetent and poorly intentioned manner. Beneath a thin veil of reluctant courteousness their attitude of surliness puts other people on the defensive.

The actions of the passive aggressive individual are characterized by an angry reluctance and a calculated inefficiency. He grumbles and protests, he procrastinates, but he does not openly accuse or rebel. He appears pained by his work, his position, his general circumstances, and his ailments. He will never admit to enjoying himself despite the fact that someone might actually catch him in the act. His whole life is one of dedicated suffering for which he feels other people are wholly responsible. The passive aggressive personality makes innumerable demands which when gratified result not in pleasure but only in more demands and new conditions. He resents everything (even himself) and verbalizes the conviction that life holds nothing for him and that he might as well be dead. But because he disguises his expressions of hostility, he cannot be openly accused of disobedience.

From the military point of view, this cantankerous attitude often takes the form of a marked reluctance to work, which the offender

frequently bases on a deep and sincere conviction that he is incapacitated by some illness such as excessive and intractable headaches, extreme anxiety, "bad feet," or varicose veins which prevent walking, marching, or working. The tendency of such individuals to "black out" is probably an exaggeration of a mild spell of vertigo. Passive aggressive personalities are very quick to use such a symptom as "blacking out" in an effort to convince their superiors that it is unsafe to use them in a job where such a spell might endanger their lives or those of their shipmates.

Usually the passive aggressive personality is regarded as a rather unwelcome member of any military group, and his superiors are prompt in transferring him to some other unit to rid themselves of an "unwilling dragon." His friends tend to react in a similar manner, since his social relations can be described by the phrase, "Whom he loveth, he chasteneth." In summary, the passive aggressive character is surly, complaining, tends to procrastinate, and implies that other people are treating him badly. This man is not a malingerer but rather a person who has minimal complaints which he over exaggerates and to which he is helplessly compliant. Despite his undeniable unhappiness he is basically as competent as most other men, yet his production is far below average. He suffers from poor motivation rather than from physical or emotional incapacitation.

Generally there are a succession of events which occur in the military career of a passive aggressive individual and finally bring him to the psychiatrist's office. The first step in this direction frequently is taken aboard ship where it is noted that the man seems to be excessively nervous and ill. With all good intentions, his corpsman frequently refers him to sick call, either at sea or at a nearby shore based dispensary, for an evaluation of his excessive headaches or anxiety. The man is seen by the medical officer, who makes an honest attempt to treat him by means of accepted recommendations and medications. The patient will not accept this advice and generally returns to sick call on several subsequent days complaining that whatever has been recommended has been to no avail and that his condition is largely intractable. Accordingly, the medical officer feels that this intractable patient should perhaps be seen by a specialist and refers him to a nearby hospital for consultation. In the hospital the same pattern of events is repeated, the man is given specific treatment and equally specifically fails to react. At this point he is referred for neuropsychiatric consultation because of his excessive concern for symptoms that cannot be clinically substantiated. Medical recommendations result in a long series of impasses because the passive aggressive patient expects and then demands some type of magical cure. If this is not forthcoming

ing in the hospital he frequently seeks advice on the outside from an osteopath, a chiropractor or "faith healer." Finally, the specialist in the hospital reaches the point where he feels that nothing can be done for this patient and the man is discharged to duty "under duress." He then may write to his mother for redress or to his Congressman demanding an "investigation" of alleged flagrant professional incompetency.

### HOSTILITY

In order to clarify why this particular individual demands such minute medical attention it is necessary to return to his basic personality structure and consider what effect it has on other people. Beneath his veneer of courteousness the passive aggressive character is deeply hostile. If the physician is not aware of this, resentment or tension may develop within the doctor who is dealing with such a character disorder. The first person to fall into this particular trap is the corpsman who is attached to the man's unit. Due to the anxiety that is provoked by the man's repressed hostility the corpsman's first impulse is to try to rid himself of the passive-aggressive patient. Although he may be convinced that this patient is not excessively ill and does not require further medical attention the patient usually demands further treatment. To avoid further useless discussion, the corpsman's tendency is to relieve himself of his tension by passing the patient on to the medical officer whose immediate inclination is to please the patient's demands as much as possible. If the doctor attempts to explain to the patient the nature of his symptoms suddenly the situation becomes more complicated and the medical officer finds himself involved in a highly personalized situation to the delight of the passive aggressor. Perhaps without his being aware of it the physician's own hostility is activated by the basically hostile attitude of the patient. This frequently produces a "guilt complex" in the medical officer when he finds himself actively disliking a patient. To remove the cause of his "guilt" his tendency is to pass the patient on to some other physician preferably by the technique of a "consultation." And so the medical merry-go-round gets underway affording the patient an ideal opportunity to play both ends against the middle and vice versa, much to the delight of his ego!

Passive aggressive personalities are very difficult to stand up to because they are basically unreasonable and because their hostility tends to activate anxiety in others. The man's behavior is such that he appears to most lay people as definitely being a sick man. The physician naturally feels that to be firm with such an individual and force him to return to duty might in some way appear to observers as being hardhearted. Because of his own fear of arousing hostility in the patient his inclination is to refer

him to someone else. Thus we see that both the corpsman and the medical officer tend to follow the path of least resistance in ridding themselves of the passive aggressive patient by complying with his demands and usually passing him on for further medical considerations.

Passive aggressive personalities frequently exhibit very strong urges toward earning attention and demanding retirement from military service on the basis of their so called disabilities. They are able to persist and will go to elaborate lengths in attempting to gain these ends. Occasionally they are successful, but their success is both a burden on the taxpayer and a travesty of justice. Hospitalization of these individuals is a needless and inexcusable expense. To the cost of his hospitalization is added the fact that the man is not producing anything while he is on the sick list, so that in the last analysis the cost of caring for such an individual far outweighs any monetary value of his wholly unsatisfactory military service.

It is of interest to note some of the implications of this pattern of events that takes a man from his work, puts him on the sick call, and finally refers him to a nearby medical center for examination by specialists. The first consideration is the fact that this man tends to lose a great deal of time from his work and that facilities, such as transportation, are required to move him around to the various points of medical examination. This "special attention" is a form of notoriety which the passive aggressor soaks up like a dry sponge. Such domenor in the long run has a bad effect on the morale of his shipmates because it puts the medical department in a bad light and lends his shipmates to believe that they, too, can "get away with it."

#### EFFECT ON GROUP MORALE

The greatest difficulty in dealing with such a man is the fact that he can influence morale in his unit by impugning the motives of other people. He can very cleverly inject a quality of caustic wit into his remarks that makes his shipmates feel guilty for their enthusiasm for their work. The man tends to make all duty aboard ship seem rather ridiculous and implies that anybody who is willing to do it is a fool. Such an individual has a diabolical ability to kill or to cripple group morale. He then gloats over his destructive prowess and looks about for new fields to confuse and conquer.

Generally, the passive aggressive personality is quite clever in using his complaints to create friction between the medical department and the people who command the various units. This friction frequently comes about because the office, ship, barracks, or battalion would like to be rid of this reluctant worker and chronic

complainer Yet the medical department insists that the man is well enough to work and sends him back to duty This also creates rather bad personal and public relations among the men since the passive aggressive character takes the attitude that he is being forced back to duty despite the fact that he is obviously a sick man Because of the persistence of such an individual's complaints, frequently considerable sums of money are expended in assuring him that he is getting a really fair examination before being forced back to duty Unfortunately, as these antics continue, the man becomes increasingly aware of the advantage he holds He constantly leans toward being ill and shows when ever possible that he is basically unable to work The man is aware that the weight of opinion among the crew is on his side and to a certain extent this makes it more difficult for the officers aboard the ship to enforce discipline His all too obvious suffering implies that the officers are callous and unappreciative of the fact that he is ill The man therefore becomes a morale breaker by assuming an attitude of righteous indignation and hostility toward the military service in general and against the military medical department in particular Finally this may result in expensive litigation and demands for a pension even after he has been discharged from active duty

### PSYCHODYNAMICS

Dynamically most of the character traits in this disorder seem to stem from only a few sources One is a deep disappointment in love which the individual suffered at a very early age His provocative behavior probably was originally directed toward that parent to whom he was most attached but who failed to reciprocate his feelings These provocations in some dim animal way were intended to elicit an affectionate response from the love object and at the same time to express strong hostility associated with the frustrating situation Such a child also feels (without the capacity to intellectualize it) that the overt expression of love from the parent considerably reduces the state of tension and anxiety which the individual is chronically burdened with Unfortunately with the passage of time the individual's demands for affection become so exaggerated that there can be no appeasement which naturally leads to further tension frustration, and provocative behavior in that order Thus, the man's adolescent behavior becomes deeply consolidated in his character structure and serves the dual functions of defense and gratification The defense function would be the petulant conviction that he is abused thus warding off the feeling of his deep need to be loved and the gratification is the chronic disguised expression of hostility that arises because of his frustrations

## TREATMENT AND DISPOSITION

Every patient who comes to the dispensary or sick call is certainly entitled to a medical examination regardless of his character structure or defects previously entered in his health record. It is always important to bear in mind in these cases that men with psychologic problems can also have a definite organic illness. Thus, the passive aggressive's backache may occasionally turn out to be caused by a kidney stone or some related pathologic process. Therefore it is important to record as clearly as possible the results of the physical examination. Once a passive aggressive personality has had his physical complaints evaluated, he should not be referred for further examinations by specialists or hospitals unless such examinations are definitely needed. At this point it is of vital importance for the medical officer to have the courage of his clinical convictions and not refer the man for further examinations just to be rid of him. An unwarranted consultation may consolidate the man's complaints and convince him irrevocably that he really is ill and that he has received inadequate or shabby treatment. Sooner or later he must be told quite firmly that he is fit for full duty and returned to it immediately. At times, this is very difficult to do in the presence of his manifest suffering, even though it be more apparent than real.

Because of the tendency of the passive aggressive personality to seek litigation and to complain to people in high political positions, the medical officer's record of clinical findings and therapy should include an opinion as to whether or not the man is fit to return to duty. Generally, passive aggressive personalities are very quick to use their medical records in the further elaboration of their complaints. They have a morbid interest in their health records as a springboard from which to launch their attacks on the integrity of the Medical Corps or even on the efficiency of the Navy as an organization vital to the defense of democracy. One cannot necessarily regard their attitudes as those of malingering because these men have convinced themselves that they are ill and that they are not being adequately treated.

Once the medical officer has firmly insisted that the man return to his duty, very often the patient will be openly hostile to the physician. Occasionally, such a passive aggressive personality will react with apparent pleasure to the fact that he is being forced back to work. Dynamically, this pleasure is the result of a reduction in overall tension as a consequence of his hostility now being concentrated on the physician, who by his firmness has become the target for the patient's vituperation. This reaction represents a somewhat masochistic component of this defect in character structure. Generally, when a man is forced to return to

full and active duty it is necessary to notify his commanding officer of the circumstances and assure him that the man is fit. Returning a man to duty under these circumstances puts him in a position of facing disciplinary action for his continuing failure to work. Because passive aggressive personalities realize the imminency of punishment and seek to avoid overt conflict they respond quite favorably to this type of situation. Provided one discounts their grumbling they seldom get into trouble once they are made to realize that the "chips are down." Although ordering him back to duty may appear to be a rather hardhearted solution of his medical problems it is the only salutary action. Whenever possible it is a good idea to see these men for a few follow up sessions in psychotherapy.

All that one can hope to accomplish in a short term psychotherapy is to transfer the petulance and provocation (which are sadistic aggressions turned inward) into overt outwardly directed hostility. This disturbs the economy of the symptom (or system) in terms of ego-function by disrupting its equilibrium. The patient dissipates tension by being outwardly angry with the physician and begins to feel the difference between this and his usual petulant and procrastinative behavior. This is probably the reason why some of these passive-aggressives react favorably to the physician's firmness on sick call—they overtly become angry with him and this relieves tension to some degree. Thus pleasure and pain become juxtaposed in their functioning. The passive aggressive reacts to other people's anger and irritation as if it were an expression of affection. This is probably related to childhood experiences in which the two were closely associated for example a hearty spanking being followed by expressions of affection.

During these psychotherapeutic interviews the passive aggressive continues to be extremely complaining. Whatever suggestions are made are met with a series of impasses constructed by the patient as defense or escape mechanisms. Generally there is no apparent progress during psychotherapy but the clinically oriented psychiatrist notices that the patient seems gratified by the attention he is receiving from the physician. Once dealt with firmly the patient becomes more tractable about returning to work. One finds by calling his ship that he is relatively happy and productive although he will never admit that he is feeling better. Always with this type of personality bluntness is the best mode of approach or attack. Once a concession is made the floodgates are opened to a veritable deluge of demands for additional concessions. It is dangerous to spar with a passive aggressive patient. The only hope of success is to be completely candid and almost brutally frank.

Hospitalization of such individuals defeats its own purpose because it affords them a golden opportunity to consolidate their

complaints and provocative behavior. These patients are chronic "sufferers," and they rarely feel that there is anything bright in their future. Because of these attitudes these men make relatively little progress when assigned to a psychiatric ward, and almost invariably they collapse as soon as they have been discharged from the security of the hospital. They cannot make a satisfactory adjustment to the facts of life nor adequately cope with the stresses and strains of the social structure because they are their own worst enemies.

If the individual with a fixed passive aggressive personality is basically intractable and cannot be returned to duty despite all his numerous complaints, it may be necessary to separate the man from military service for the "convenience of the Government." Even the threat of disciplinary action may fall on deaf ears, in which case the man remains a very reluctant worker and is a chronic thorn in the side of the people who are trying to run the organization. Because of his low morale, he remains an unproductive worker, which of itself is evidence that he is psychologically unfit for military duty.

### CONCLUSIONS

In the last analysis the basic trouble with such a passive aggressive personality is that the man has extremely poor motivation. He uses elaborate symptoms as an excuse for his failure to adjust to military service, and he places the blame on "the brass" in general and the medical officer specifically. People who are unenthusiastic and recalcitrant simply do not belong on the varsity squad. Ideally, they should be kept out of the service whenever possible. However, such a person, when appearing for his premilitary screening, very often seems enthusiastic about military training. Such enthusiasm, however, is short-lived, once the initial glamor has faded and the "heat is on." Since the recruit tends to keep his character traits in abeyance during his initial interview, the first examiner has no way of really demonstrating the underlying character defect. Once on active duty, however, the passive aggressive soon reveals his surly behavior, his pro-posterous complaints, his irascible, cantankerous attitude, and his reverse negative motivation.

The only way to deal with passive aggressive personalities is first to rule out the possibility of any definite organic lesion as a basis for their "symptoms." Then they must be firmly returned to duty rather than referred for further examinations and hospitalization, which are and would continue to be entirely unwarranted. If the individual persists in his recalcitrancy, he should be separated from the military service without benefit of retirement for physical or mental illness.

### REFERENCE

1. Hodge, J. R. Passive-dependent versus passive-aggressive personality. *U S Armed Forces M J* 6:84-90 Jan 1955.





## Clinicopathologic Conference

Brooke Army Hospital Fort Sam Houston Tex.\*

### ADRENAL INSUFFICIENCY QUADRIPLÉGIA AND COMA

**Summary of Clinical History** A 64 year old white male retired Army officer had been in apparent good health until September 1949 at which time he developed bloody diarrhea and fever while traveling in Mexico. Following recovery from this illness he began to have weakness, easy fatigability, nervousness and difficulty with coordination. In July 1950 he was admitted to an Army hospital and diagnoses of toxic hyperthyroidism hook worm disease, and chronic larvngitis were made. Each of these entities responded well to treatment, and the patient was discharged on maintenance propylthiouracil therapy. Outpatient urologic evaluation because of urinary frequency resulted in the diagnosis of benign prostatic hypertrophy and a recommendation for transurethral prostatic resection. The patient declined an operation and was followed in a civilian clinic during the latter months of 1950. There it was felt that many of the patient's complaints were on a functional basis. Benign rectal polyps were discovered however, and these were fulgurated. He was admitted to a civilian hospital in December 1950 with the chief complaints of weakness and nervousness. Because of additional complaints of tibial pains and the discovery of consistently elevated acid phosphatase determinations (10.5 to 12.5 Bodansky units) he was transferred to an Army installation for further evaluation on 3 January 1951. Within nine days after admission to the Army hospital progressive nausea vomiting, and hypotension developed and

Brig Gen Stuart G Smith MC USA Commanding General From the Laboratory Service Col George J Miller MC USA Chief

for the ensuing month the patient received supportive therapy, penicillin, and Doxa Acetate (brand of desoxycorticosterone acetate). On 16 February the patient began to have daily febrile episodes, to 100° or 101°F. Blood pressure remained at about 66/30 mm Hg. Adrenal cortex extract and cortisone were then administered daily as well as maintenance doses of Doxa Acetate, and marked clinical improvement occurred within the next six days. Thereafter the patient was maintained on daily Doxa Acetate and cortisone, he was discharged from the hospital on 3 July on these drugs, along with supplemental salt and testosterone. Pertinent laboratory studies during this period of hospitalization indicated persistently depressed serum sodium determinations (125 to 140 meq/l), an average daily urinary 17-ketosteroid level of 3 mg per cent, an abnormal eosinophil response to corticotropin (ACTH) and epinephrine, positive Robinsohn-Power kepler tests, and a distinctly flattened glucose tolerance curve.

The patient was rehospitalized briefly in November because of frequent bouts of vertigo, tinnitus, and staggering gait. Discharge diagnosis was "otitis media, acute, improved." In May 1952 he began having generalized convulsive seizures which characteristically lasted for 10 to 15 minutes, were not associated with unconsciousness, disappeared spontaneously, and resulted in brief, postseizure dizziness. His final admission, to this hospital, was on 16 May 1952.

The patient's past, social, and family histories were essentially noncontributory.

**Physical Examination.** Physical examination upon admission disclosed a temperature of 101.2°F, a pulse rate of 126 per minute, and a blood pressure of 160/90 mm Hg. Significant abnormal physical findings included a barely palpable, nontender liver, a small, firm nodule of the left epididymis, absence of abdominal reflexes, slight motor weakness of the left extremities, and generalized tan hyperpigmentation of the skin and mucous membranes. Save for a mild normochromic, normocytic anemia and a corrected sedimentation rate of 31 mm per hour, admission hemogram was essentially within normal limits. Urinalyses were not remarkable. Electrolyte studies and fasting blood sugar levels were within limits of normal.

**Course in Hospital.** The clinical impression upon admission was that the patient had sustained a cerebrovascular accident. Because of primary complaints of weakness, daily dosages of cortisone and Doxa Acetate were increased. On 25 June the patient complained of hoarseness, difficulty in walking, and unsteadiness while standing. On 6 July bilateral Babinski signs were elicited, and spinal fluid protein level was 111 mg per cent. Shortly thereafter urinalyses repeatedly demonstrated albumi-

nuria, hyaline casts and microscopic hematuria. Electrolyte studies and leukocyte counts remained within normal limits. On 8 July the patient had a typical left sided Jacksonian seizure, and spinal fluid studies including manometric recordings, were normal save for total protein concentration of 110 mg per 100 ml. No organisms could be cultured from the spinal fluid.

Marked weakness of the left extremities, marked apathy, and slurred speech ensued, followed by semistupor on 14 July. Beginning on about 10 July the patient's blood pressure gradually decreased, pulse rate increased, and low grade fever recurred. Slight nuchal rigidity and flaccid paralysis of the left upper extremity developed. The neurology consultant additionally noted bilateral Babinski signs, right upper extremity spasticity, right-sided hyperreflexia and slight right facial weakness. Dyspnea and cyanosis appeared on 14 July. For the following two days neurologic findings were exceedingly variable. The patient died in coma on 16 July 1952, almost three years after the initial onset of symptoms.

#### CLINICAL DISCUSSION

Doctor Hollander.\* This patient's difficulties began with diarrhea. If, as we believe, the patient had adrenal insufficiency of prolonged duration, it is possible that this diarrhea constituted the initial symptom. Gastrointestinal symptoms are often the initial event in the relentlessly downhill course of Addison's disease. It is possible that the bloody character of the diarrhea could be ascribed to the rectal polypa. It is further conceivable that the symptom triad of diarrhea, weakness, and nervousness encountered early in this patient's medical history could be ascribed to hyperthyroidism. Hyperthyroidism is about 10 times more frequent in people with Addison's disease than in people with intact adrenal function.

Two possible explanations for this relationship have been advanced. One can experimentally demonstrate the reciprocal relationship between the adrenals and thyroid by the depression of radioactive iodine uptake by the thyroid following the administration of large quantities of cortisone. Secondly, hyperthyroidism *per se* acts as a stressful systemic phenomenon and forces increased adrenal activity. Clinical evidence of hyperthyroidism abated in this patient. This fact would be of clinical importance in a patient with Addison's disease since he could not be expected to tolerate well the added stress of thyroid hyperfunction.

I assume acid phosphatase determinations were done because of ribial pains. Since I feel that insufficient practical evidence is present to seriously suspect primary prostatic malignancy, the elevated acid phosphatase levels might occur by either of two mechanisms. First

\*Capt. Vincent P. Hollander, USAF (MC) (b). Chief, Biomedical Section, School of Aviation Medicine, Randolph Air Force Base, Texas.

temporarily elevated levels may be obtained if determinations are performed shortly after rectal examination and prostatic palpation or massage. Second, similarly elevated phosphatase levels may be produced by a poorly understood mechanism whereby the blood sample is allowed to stand at room temperature, perhaps for 24 hours or so before the chemical procedure is started. In a patient with Addison's disease, tibial pains might actually be on the basis of muscle cramps secondary to excessive salt loss associated with increased water ingestion. Co-existing rheumatoid disease might possibly account for these pains. There is a statistically significant co-existence of Addison's disease and rheumatoid arthritis. Rheumatoid disease, however, appears unlikely in the patient under discussion.

The patient's hoarseness merits some comment. Laryngeal muscular weakness commonly is found in patients with Addison's disease. The diffuse hyperpigmentation described in the protocol also appears characteristic of Addison's disease, and we need not seriously consider other differential causes of pigmentation such as hemochromatosis, argyria, acanthosis nigricans, and the like.

Let us review the salient signs and symptoms indicative of Addison's disease. A majority of these indications were manifest in the case under discussion. We may tabulate weakness, easy fatigability, hoarseness, weight loss, dehydration, gastro-intestinal disturbances such as anorexia, nausea, vomiting, and diarrhea, hypogonadism, hyperpigmentation, hypotension, and nervous and mental disturbances. The latter findings are often difficult to evaluate in patients with Addison's disease. The occurrence of psychiatric aberrations is known to most of us, but less widely appreciated are the neurologic findings, including electroencephalographic changes, which occur so frequently and which may simulate localized cerebral or spinal cord disease.

We may postulate that some of the neurologic abnormalities can be attributed to hypoglycemia. Hypoglycemia in degrees ordinarily well tolerated by normal individuals may produce marked neurologic difficulties in patients with Addison's disease. In other words we may say that these people are "hypoglycemia sensitive." Neurologic difficulties may also be ascribed to "wet brain" resulting from adrenal steroid therapy, particularly to Doca Acetate therapy. Lastly, many diseases not uncommonly affecting the central nervous system such as tuberculosis, tumors, cryptococcosis, and histoplasmosis may have anatomically demonstrable adrenal involvement and thus produce the picture of localized central nervous system disease combined with Addison's disease.

The laboratory diagnosis of Addison's disease warrants some discussion. We are all aware of the commonly employed laboratory evidences such as hyponatremia, hypochloremia, hyperkalemia, hypoglycemia, flat glucose tolerance curve, decreased urinary 17 ketosteroids and 11 oxycorticosteroids, positive Thorn eosinophil test, and positive Robinson-Kepler-Power water loading test. To this list

may be added decreased plasma corticoids positive salt deprivation test and increased insulin sensitivity. Other clinically useful diagnostic modalities include decreased cardiac size abnormal electroencephalographic and electrocardiographic tracings and evidences of impaired renal function such as decreased renal blood flow decreased glomerular filtration and abnormal uric acid excretion. I would like to comment briefly on some of these laboratory procedures in adrenal insufficiency suspects.

Hyponatremia may not be present in patients with Addison's disease particularly with Doca Acetate therapy. Interpretation of serum sodium levels necessitates correlation with chloride and bicarbonate levels as well as the clinical status of the patient.

Serum potassium determinations in uncomplicated Addison's disease are out of particular diagnostic aid and levels may be low rather than high in patients receiving Doca Acetate.

Low urinary excretion levels of 17-ketosteroids and 11-oxy corticosteroids are characteristically obtained in Addison's disease. Decreased excretion of 17 ketosteroids however may be seen in other debilitating diseases. Low urinary excretion of 11-oxy corticosteroids is not pathognomonic of Addison's disease since the test widely employed is not entirely specific for these substances.

In the Thorn eosinophil test the use of ACTH yields less consistent results than the use of epinephrine. With ACTH of course in the presence of normally responsive adrenal glands a 60 to 70 per cent fall in circulating numbers of eosinophils can be expected. In Addison's disease a significantly diminished eosinophil response is obtained. One word of caution. Commercially available ACTH preparations commonly have significant antidiuretic properties and in judicious usage may lead to adrenal crisis in Addisonian patients by virtue of prompt water retention and sodium dilution.

Methods for measuring plasma corticoids are now available and the method of Nelson and Samuels<sup>1</sup> is quite useful. Normal blood values of 4 to 10  $\mu\text{g}/100\text{ ml}$  are reported with significantly reduced levels in patients with Addison's disease. In clinically questionable cases of Addison's disease however this determination has limited diagnostic value.

Increased insulin sensitivity has been described in patients with Addison's disease. The test is not without hazard however since these patients are inordinately sensitive to insulin and may go into irreversible adrenal crisis from the insulin test doses usually employed. An insulin glucose tolerance test devised by Scott and Engel is a safer diagnostic procedure.

The water loading and salt deprivation tests may induce acute adrenal insufficiency states for diagnostic purposes. These procedures are out of the question in this day when other applicable laboratory tests are available.

In summation, I feel that the patient definitely had adrenal insufficiency or Addison's disease. In view of the neurologic symptomatology and elevated spinal fluid protein it is my guess that rather diffuse central nervous system disease existed as well. To equate the two major pathologic processes in this patient, namely adrenal and cerebral disease we may postulate the presence of a disease process capable of producing these changes such as tuberculosis, histoplasmosis, or cryptococcosis. I tend to discount the possibility of neoplastic disease with widespread metastases since I have no good indications of a possible primary anatomic site.

Doctor Lind: Doctor Hollander, you mentioned neurologic findings encountered with Doca Acetate therapy. Did you mean hypertension? To what may cerebral edema be attributed?

Doctor Hollander: I meant severe hypertension, sodium retention, diffuse edema, and cerebral edema. Much of the neurologic picture seen in patients with Addison's disease may well be attributed to Doca Acetate therapy. In a group of 30 patients on whom bilateral adrenalectomy had been performed we have found it necessary to use Doca Acetate only once. Although we appreciate the fact that an occasional patient will require Doca Acetate because of hypotension which can not be corrected by cortisone we feel that cortisone therapy alone is the treatment of choice.

Dr. Hollander's diagnosis:

Addison's disease, possibly secondary to disseminated cerebral tuberculosis, histoplasmosis, or cryptococcosis.

#### PATHOLOGIC FINDINGS

Doctor Sulak: Following correlation of clinical and necropsy data, death was attributed to adrenal cortical insufficiency, terminal pulmonary edema and congestion, and acute bronchopneumonia of the lower lobes bilaterally. Approximately three weeks before the patient died, a small, ulcerative lesion of his upper gum was biopsied and the basic disease responsible for the protean symptomatology was identified.

At necropsy the significant findings on external examination were those of emaciation, diffuse brownish hyperpigmentation of skin and mucous membranes, the healing gum lesion, and a firm 2 cm nodule within the upper pole of the left epididymis.

The most significant gross pathologic changes affecting internal viscera in approximate order of decreasing severity, were found within the adrenal glands, brain, kidneys, left epididymis, tricuspid cardiac valve, upper gum, liver, spleen, and random abdominal lymph nodes. These changes may be described briefly as solitary and multifocal, occasionally confluent granulomatous nodules with varying degrees

\*Col. Carl J. Lind, Jr., MC, USA, then Chief of Laboratory Service.

\*Maj. Michael H. Sulak, MC, USA, Laboratory Service.

of caseous necrosis. The adrenals were almost totally destroyed and at the opposite end of the spectrum the hepatic splenic and nodal lesions were barely discernible by the naked eye. Microscopically these lesions were productive and exudative granulomatous processes produced by minute ovoid intracellular organisms morphologically characteristic of *Histoplasma capsulatum*. Post mortem cultures of heart blood and adrenal and cerebral tissues yielded characteristic colonies of *H. capsulatum* and microscopic morphologic features of the cultivated organisms confirmed these observations.

Multiple lesions were scattered throughout the cerebral medullary substance. The largest single lesion measured approximately 2 cm in diameter and occupied the right optic thalamus (fig 1).

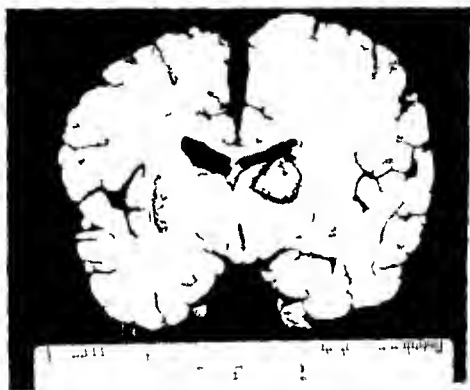


Figure 1 Coronal section of fresh brain at the level of the mamillary bodies showing granuloma occupying the right optic thalamus

Oil immersion photomicrographs of tissues stained by the periodic acid Schiff technic disclosed myriads of the ovoid encapsulated organisms measuring 2 to 4 microns in diameter clustered within macrophages and parasitized parenchymal cells and lying freely in tissues. Figures 2 and 3 show typical fields with adrenal and kidney lesions respectively. It will be noted that in figure 2 empty ring forms predominate.

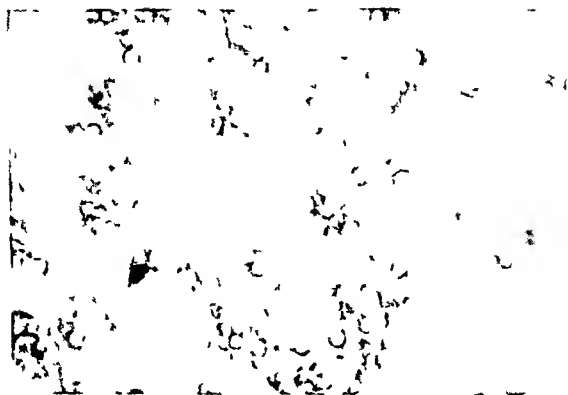


Figure 2 Photomicrograph of an adrenal lesion showing predominantly empty ring forms of *H. capsulatum*. (Periodic-acid Schiff stain  $\times 906$ )

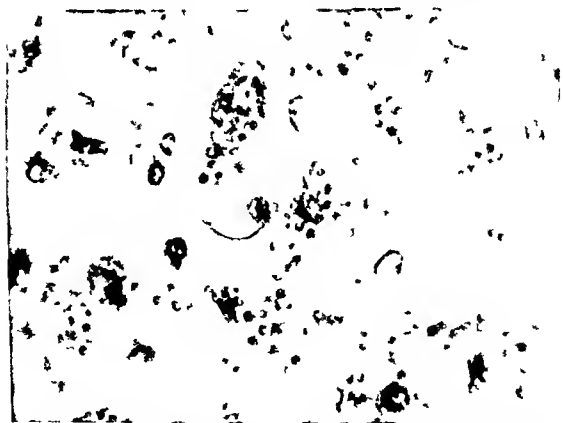


Figure 3 Photomicrograph of a kidney lesion showing large numbers of encapsulated forms of *H. capsulatum*. (Periodic acid Schiff stain,  $\times 906$ )



Figure 4 shows the microscopic characteristics of the mycelial growth phase of the organism with a feltwork of thin septate hyphae and the pathognomonic tuberculate chlamydospores the spore-bearing bodies resembling a medieval mace

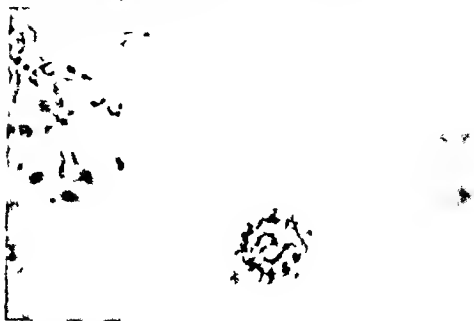


Figure 4. Photomicrograph of culture mount showing characteristic tuberculate chlamydospore of *H. capsulatum*. (Lactophenol cotton blue stain,  $\times 2900$ )

If given some degree of scientific latitude we may say that the diseases histoplasmosis and tuberculosis manifest many strikingly similar clinical and pathologic characteristics. These similarities will become more apparent in a brief discussion of histoplasmosis as an entity of increasing clinical importance particularly within the United States.

Darling<sup>2, 3</sup> in Panama described the first three clinical cases of histoplasmosis in 1905-1907. He felt that the etiologic organism was a protozoan. It wasn't until 1934 that the causative agent was conclusively demonstrated to belong to the *Fungi imperfecti* by De Nonbreun<sup>4</sup> and by Hansmann and Schenken.<sup>5</sup> Until the decade 1940-1950 the disease was considered an invariably fatal systemic process characterized by reticulo-endothelial granulomatosis. During this period however an increasing body of critical evidence made it clear that histoplasmosis was much more widespread than had been previously supposed and that a large endemic area existed in the United States in the area comprising the Mississippi-Ohio valley. Largely through the studies of Nelson,<sup>6</sup> Furcolow,<sup>7</sup> Smith,<sup>8</sup> Christie,<sup>9</sup> and others it was made increasingly apparent moreover that a benign form of the disease was of much greater statistical incidence than the disseminated fatal variety. Repeated demonstrations of non-tuberculous pulmonary calcific

lesions with negative tuberculin and positive histoplasmin skin tests in asymptomatic patients living in the east central United States fostered and fortified this concept of the common benignity of histoplasmosis.

Studies on the epidemiologic aspects of histoplasmosis have yet to demonstrate human-to-human or animal-to-human modes of transmission. Emmons<sup>10</sup> demonstrated the saprophytic existence of the organism in soil in endemic areas, and many different animal species in these areas have been found with the natural infection. The inhalation of air-borne spores is considered to be the means by which humans most commonly come into contact with the infective organism, largely because of the frequency of inactive and healed pulmonary lesions. Much as in pulmonary tuberculosis reinfection or progressive dissemination may occur with serious, often fatal consequences.

The reticulo endothelial system is always affected in the disseminated processes. A granulomatous response is elicited within host tissues with formation of characteristic productive and exudative lesions containing varying numbers of the yeastlike organisms. These changes in tissues represent the yeast or parasite phase of growth of *H. capsulatum* in contradistinction to the mold or mycelial phase obtained on artificial media at room temperature.

Within recent years the use of the periodic acid Schiff staining technique with its several modifications and the use of the Girdley stain has greatly facilitated the histopathologic diagnosis of histoplasmosis as well as other mycotic diseases.

With dissemination of the disease any and all viscera may become involved. The adrenals, however, almost as commonly as the lungs and reticulo endothelial structures, are sites of involvement in disseminated histoplasmosis. Accordingly, the syndrome of Addison's disease may often dominate the clinical picture, as was true in the case under discussion today.

Despite the increasing facility of tissue diagnosis by the newer staining techniques previously mentioned, I believe that the use of tissue diagnosis to the exclusion of culture studies is undesirable. Inherent in the histologic diagnostic method are several pitfalls. There is the possibility of overlooking the organisms when they are present in small numbers. The very diminutiveness of the organisms leads to confusion with Leishmania bodies and with cellular debris and other artifacts, particularly calcified particles.

Within the past decade serologic tests for diagnostic purposes have come into existence and are enjoying increasing use. These include complement fixation tests using antigens prepared by various methods, colloidal agglutination, precipitin and sheep hemagglutination procedures. These tests at the present time appear to have some serious limitations. One of these limitations is the frequent occurrence of cross reactions with blastomycosis and coccidioidomycosis. Never-

theless positive serologic reactions with progressively rising titers in active forms of histoplasmosis are held to be of diagnostic significance by most investigators

The widely employed histoplasmin skin test is usually interpreted in much the same fashion as the tuberculin test namely that a positive reaction indicates past or present contact with the organism and that a negative result is obtainable in advanced cases of histoplasmosis

Culture of blood bone marrow and pertinent body fluids remains our diagnostic procedure of choice Adequate mycologic diagnosis necessitates growth at 37 C as well as at room temperature with production of both the yeast and mycelial growth phases respectively Conversion of one phase of growth to the other is certainly a valuable adjunct to laboratory diagnosis Blood agar Sabouraud's dextrose agar cornmeal agar and broth are the media most widely employed Microscopic examination of lactophenol cotton blue culture mounts for morphologic identification is a further necessary step in laboratory diagnosis Identification of the pathognomonic tuberculate chlamydospores (fig 4) firmly establishes the diagnosis

In summation the major laboratory adjuncts to clinical diagnosis of histoplasmosis are those of blood and bone marrow cultures tissue examinations serologic tests and skin tests

Finally with apology to Doctor Hollander since no clues were given in the protocol as to the nature of the disease producing the syndrome of Addison's disease we may conclude that the patient's major difficulties were produced by widely disseminated histoplasmosis manifested notably by adrenal and cerebral involvement

#### Pathologic diagnosis

Widely disseminated histoplasmosis with bilateral adrenal destruction and multifocal cerebral lesions

Doctor Lind Would you say a few words about the status of therapy in histoplasmosis?

Doctor Fox: Surgical intervention of course could be beneficial or curative in anatomically localized lesions In the three cases of disseminated histoplasmosis at this hospital the vanillate compounds were tried as described in the pediatric literature These compounds have fungicidal properties and are used in some industries as food preservatives We had no appreciable success with these agents in these cases Promin (brand of glucosulfone sodium) stilbamidine isethionate Atrabrine (brand of quinacrine hydrochloride) and most of the antibiotics available to us to the present time have also proved ineffectual Several reports demonstrating clinical improvement by splenectomy in those patients having hypersplenism have dotted the literature here and there Immunization procedures have not proved fruitful In short no really effective and certainly no definitive therapeutic agents are available to us at the present time

## REFERENCES

- 1 Nelson D H. (Salt Lake City) and Sannels L T. Method for determination of 17 hydroxycorticosteroids in blood 17 hydroxycorticosterone in peripheral circulation *J Clin Endocrinol* 12 519-526 May 1952
- 2 Darling S T. Protozoan general infection producing pseudotubercles in lungs and focal necrosis in liver spleen and lymph nodes *J A M A* 46 1283-1 85 Apr 78 1906
- 3 Darling S T. Fatal infectious disease resembling kala azar found among natives of tropical America *Arch Int Med* 2 107 Sept 1908
- 4 DeMonbreun W A. Cultivation and cultural characteristics of Darling's Histoplasma capsulatum. *Am J Trop Med* 14 93-125 Mar 1934
- 5 Hansmann G H. and Scheeken J R. Unique infection in man caused by new yeast like organism pathogenic member of genus *Scedonium* *Am J Path* 10 731 738 Nov 1934
- 6 Christie A. Histoplasmosis. In Nelson W E. (editor) *Textbook of Pediatrics* 6th edition. W B Saunders Co Philadelphia Pa 1954 pp 560-564
- 7 Furcolow M L. Further observations on histoplasmosis mycology and bacteriology *Pub Health Rep* 65 965-994 Aug 4 1950
- 8 Smith C. E. Coccidioidomycosis *W Clin North America* 27 790-807 May 1943
- 9 Christie A. Histoplasmosis and pulmonary calcification—geographic distribution. *Am J Trop. Med.* 31 747-752 Nov 1951
- 10 Enmons C. W. Isolation of *Histoplasma capsulatum* from soil *Pub Health Rep* 64 892-896 July 15 1949

## GOOD BUT NOT HELPFUL ADVICE

The value of the good advice of the physician can be judged by considering the nature of that advice. And it should be observed that in regard to the prevention of heart disease the advice of the personal physician corresponds to the precepts available for other methods of education and propaganda which might be used in preventive programs. By and large these precepts are common sense generalities—"don't overdo things" "practice moderation in all things" "avoid violent emotions" "stop smoking" (maybe) "get a good vacation every year" and so on. These platitudes are harmless and even admirable, but there is not the slightest guarantee of their virtue for the prevention of heart disease.

—EDITORIAL

in *Journal of Chronic Diseases*  
p 456 Apr 1955

# SERVICE ARTICLES

## DEPENDENTS' MEDICAL CARE ACT

PAUL I. ROBINSON *Major General MC USA*

**F**OR YEARS it has been known that dependents of many active members of the uniformed services were not able to avail themselves of the medical care which was provided in hospitals of the military services. Recently, it was estimated that some 800,000 dependents (40 per cent) were so affected. Care in military and Public Health Service hospitals was rendered on an availability basis and such care was a privilege and not a right.

In many fields of labor and industry, health plans have grown up during the past several years. A goodly proportion of our citizens provide for their hospital and physicians care by prepaid insurance and health plans. One third of all members of the armed services were returning to civilian life each year and incentives were needed to stabilize careers.

These facts were taken into consideration in the formulation of a bill concerning which when he signed it into law, the President of the United States said: "I have today approved with great satisfaction the directive under which the military dependents' medical care program will operate beginning December 7, 1956. Prior to this time, at least 40 per cent of our service families were unable to receive adequate medical care from the Government. This important improvement assures hospital care at all times to the wives and children of active duty personnel. It removes one of the greatest sources of worry to our servicemen and servicewomen around the world."

"A significant new feature of this law authorizes the use of civilian hospitals and facilities for the immediate families of active duty servicemen. The cost to a service family for hospitalization in any facility, civilian or military, will be limited to a payment of either \$25 or an amount equivalent to the subsistence charge of \$1.75 per day, whichever is the greater. For this charge, all hospital services and doctors' fees for the period of hospitalization are covered. This program also continues the provision for medical care for the dependents of both active and retired personnel in military facilities on a space available basis."

Presented to the Society of Medical Consultants to the Armed Forces at Washington, D. C. on 26 November 1956.

From the Office of The Surgeon General, Department of the Army, Washington 25, D. C.

"I have been personally interested in this important program since its inception. I feel strongly that this important measure will have a far reaching effect on service morale at home or on our widely flung posts, ships, and bases around the world, and thus effectively strengthens the defense of our country."

The Dependents' Medical Care Act became law on 7 June 1956, to be made effective on 7 December 1956. It provides for uniform medical care for dependents of active and retired members of the Army, Navy, Marine Corps, Air Force, Coast Guard, and the commissioned members of the Public Health Service and the Coast and Geodetic Survey in uniformed service facilities. Dependents of deceased members of any of these services, if the member died on active or retired status, are also eligible for medical care. The Act provides for care in civilian hospitals and by civilian physicians of dependents of active duty members, if they are on active duty for more than 30 days.

It is evident that the program for dependents' care resolves itself into two distinct parts—care in uniformed service facilities and care in civilian hospitals. The uniformed service portion of the program will be administered by the Army, Navy, Air Force, and Public Health Service through their Surgeons General, and is a continuation of programs which have been in force on a long uniform basis for many years. These four services will also operate the civilian part of the program in overseas areas except Alaska, Hawaii, and Puerto Rico.

The administration of the civilian part of the program in the United States, Alaska, Hawaii, and Puerto Rico for all six services has been delegated to the Secretary of Defense who has, in turn, delegated this authority to the Secretary of the Army. Further delegation has been to the Chief of Staff, the Deputy Chief of Staff for Logistics, the Surgeon General, and the Executive Director of the program, which position I hold. The Secretary of Defense and the Secretary of Health, Education, and Welfare have issued a directive that delineates the program in detail and is the basis of operation of my office. The essential provisions of the law and the directive are as follows:

**Eligibility.** Those eligible are the wives and children or dependent husbands and children of active duty personnel of the Army, Navy, Marines, Air Force, and Coast Guard and of the commissioned members of the Public Health Service and the Coast and Geodetic Survey when on active duty for more than 30 days.

**Identification.** All of the uniformed services are issuing a new Dependents' Medical Care card. This is to be fully available by 1 July 1957. In the meantime, for those to whom the new card

has not been issued, methods of identification which are in use, plus supplementary information such as driver's license and personal inquiries will have to be utilized

The new identification card is to be known as Dependents' Authorization for Medical Care DD Form No 1173 and will be the same for all of the uniformed services. One card will indicate the names of all dependents. It will be issued for a maximum of two years, or for a shorter time if a serviceman's enlistment or expected tenure of service is for a shorter time at the time of issuance. Each of the uniformed services is responsible for issuing and discontinuing the cards.

**Physician** A physician for this program is "a person who is legally qualified to prescribe and administer all drugs and to perform all surgical procedures." Included are doctors of medicine and doctors of osteopathy who are so licensed by the states and territories.

**Hospital** A hospital means only an institution which is operated in accordance with the laws of the jurisdiction in which it is located pertaining to institutions identified as hospitals is primarily engaged in providing diagnostic and therapeutic facilities for surgical and medical diagnosis, treatment and care of injured and sick persons by or under the supervision of staff physicians or surgeons, and continuously provides 24 hour nursing service by registered graduate nurses. Institutions which are primarily places of rest—those for the aged, nursing homes, convalescent homes and those for treatment of alcoholism or drug addiction—are specifically excluded. Also for the civilian part of the program any facility operated by the Federal Government is excluded, except for emergencies. This excludes the Veterans Administration hospitals from general participation.

**Inpatient Care** The civilian part of the program is essentially for inpatient care. The dependent is entitled to care in semi-private accommodations—two, three, or four beds in a room. Care in a hospital is authorized for diagnosis, treatment of acute medical and surgical conditions, maternity and infant care, dental care that is a necessary adjunct to medical or surgical care (except that restorations are not authorized), acute emotional disturbances where necessary to protect the patient, and contagious diseases. Hospitalization in a civilian facility is authorized for 365 days if necessary, and all necessary services and supplies shall be provided for this period. Hospital care is not authorized to cover treatment of chronic diseases or nervous and mental disorders, elective medical and surgical treatment, domiciliary care, treatments or procedures ordinarily treated in outpatient facilities, or ambulance service.

**Outpatient Care** In general, outpatient care is not authorized. Prenatal and postnatal care is authorized on an outpatient basis for maternity cases. Two visits for infant care as well as immunization during these two visits are authorized. Any therapy, if prescribed while the patient is in the hospital, may be continued on an outpatient basis after discharge from the hospital. In cases of bodily injury, the patient can be cared for as an outpatient at Government expense. Also for bodily injury or surgical operations, a certain amount of pre admission diagnostic tests and services as well as a certain amount of such service following hospital discharge can be had at Government expense.

**Costs to Patient** The patient must pay the first \$25 of the hospital charge or \$1.75 for each day in the hospital, whichever is the greater. If the physician prescribes a private room, the patient must pay 25 per cent of the difference between the private room charge and the weighted average of semiprivate room charge. If the patient elects to have a private room, she must pay all of the difference between private and semiprivate accommodations. If the physician prescribes private nursing service, the patient must pay the first \$100 plus 25 per cent of the additional charges for such service. If the patient desires private nursing service, and this is not prescribed by the physician, she must pay all of the charges for this service. When a patient is treated for a bodily injury and not admitted to a hospital, she must pay the first \$15 of the cost and any charges in excess of \$75 for roentgenographic and laboratory examinations for this treatment. If maternity cases are cared for in the home or office, the patient must pay the first \$15 of the charges. If laboratory and roentgenographic tests are accomplished before admission to a hospital for a surgical procedure under the direction of the attending physician, the patient must pay for all of such charges in excess of \$75, unless additional charges can be fully justified by the attending physician. If tests and laboratory and x-ray procedures are prescribed after discharge from the hospital, the patient must pay all in excess of \$50 of such charges, again unless the physician justifies additional charges. (This does not apply to deep x-ray therapy that is prescribed while the patient is in the hospital. Such therapy can be continued at Government expense after the patient leaves the hospital in accordance with the Schedule of Allowances.)

**Costs to Government** Except for the charges specifically stated to be the responsibility of the patient, the Government will pay the cost. It is emphasized that the dependents' medical care program is a full service plan, and the physician or hospital may not charge the patient any fees other than those which have been specifically designated for the patient to pay.



The progress already achieved by the Office of the Executive Director in the implementation of the program can be summarized in a discussion of hospital and physician costs and the general operation of the program.

**Hospital Costs** The American Hospital Association by resolution of its House of Delegates has recommended that hospitals in states assigned to Blue Cross bill in accordance with Blue Cross rates in effect at the time of submission of a statement. Nonmember hospitals may bill at their standard rates but there is no reason why the Blue Cross cannot try to obtain discounts from these hospitals. Since the basic reason for this lower rate is prompt and complete payment it would appear that hospitals might well allow discounts for the medical care program. The hospitals in those states in which care has been assigned to the insurance industry presumably will bill at their normal rates, but here again it is expected that some discount may be made for prompt and complete payment.

**Physician Costs** Each state medical association was asked to submit a schedule of allowances to be used as a maximum for payment of physicians. The association was asked to name its own Fiscal Administrator. Many states named their own Blue Shield others insurance companies, some decided to handle their own fiscal business. As of 26 November 1956 contracts are in effect in 30 states and territories. 12 additional ones are complete with no differences known to us but ratification by committee, house of delegates or council in these states is pending. This has been accomplished since 24 October by individual negotiations between representatives of each state and a team of Government negotiators. Two days were allowed for each state. Contracts in 10 states are not in effect for various reasons.

**Operation of the Program** Reduced to its most simple terms the operation of the program for hospital care will be somewhat as follows:

- 1 The patient goes to the physician of her choice who sends her to the hospital, performs service, and directs discharge. The physician's bill is submitted on Statement of Services Provided by Civilian Medical Sources DA Form 1863 to the local Blue Shield organization or other fiscal agent who pays the physician directly and consolidates his bill with others; these are forwarded to the Executive Director's office once monthly. The Executive Director certifies the complete amount for payment to local Blue Shield.

- 2 The hospital collects the authorized amount from the patient and submits monthly consolidated vouchers of the balance on the same form to the Executive Director for reimbursement.

3 The physician and hospital programs are both administered by the contractor on a nonprofit basis. In other words, the administrative costs are those actually incurred by the Blue Cross, Blue Shield, medical society or insurance company, and these costs are subject to audit by the Army.

4 The state medical associations are expected to use their grievance and review committees to render advice on questions that may arise as to charges or type of practice. Unusual conditions are reportable to the Executive Director from any source.

5 In those areas where either physician or hospital contracts are not in effect on 7 December, physicians and hospitals can accept patients under the program and forward their bills to the Army commanders for adjudication and payment.

**Fraud.** We are alert to the possibilities of fraudulent acts in this program. They may occur in three general areas. Ineligible persons may pose as dependents. Ineligible hospitals or physicians may submit charges and receive payment. Charges for procedures not accomplished may also be presented for payment. However, methods of identification have been devised. Auditing and inspection procedures will be accomplished. Those who have perpetrated fraud may be subject to prosecution by the Federal Government. Steps will be taken to recover money from individuals or agencies who have defrauded the Government.

**Fee Schedules.** As must be the case with all fee schedules, the one that was sent out does not meet many of the problems which arise. The schedule itself lists some 1,700 items. Approximately 200 common procedures were marked with an asterisk, and the state medical associations were urged to complete a schedule on the items so marked, if they were unable to accomplish a schedule on each item. No way could be devised to recognize in the schedule differences in fees for general practice versus specialty or rural versus urban situations. As a consequence, most of the fee schedules were designed to cover the maximum fees for the specialties. In the field of surgery, many of the procedures are accomplished only by those who have had long training within a specialty. Many procedures, however, are accomplished by general practitioners and doctors of osteopathy as well as by specialists. Specialists' rates for these procedures were, in most cases, quite high. Our office adopted a policy that the fee schedules in each state should represent the normal charges of physicians as a whole, for individuals of an income ranging from \$4,500 to \$5,000 per year. It had been estimated that more than 90 per cent of all of the dependents who seek care under this program will have an average yearly income of not more than \$4,500. All possible information from Blue Shield and other payment plans were used by our negotiators to arrive at a figure for each of the 1,700 items in the schedule.

In many of the states apprehensions were expressed concerning the general philosophy of the Dependents' Medical Care Act. Many persons sincerely fear expansion of this program into other fields. Many fear that the law itself, since it implies a full service coverage, has a tendency to obstruct free communications between the patient and the physician. Some states indicate that their high fee schedules were purposely designed to cover all of these contingencies. On the other hand several states entered into the program in the spirit with which it was approached by Congress and submitted reasonable and acceptable rates, together with a full understanding of the contractual procedures that were necessary insofar as the Government was concerned.

Some of the states have developed elaborate plans for controlling, within their own borders, the amount which will be paid to each physician and will require the physician to accept his normal charges as long as they are within the fee schedules. Many of the states, however, are of the opinion that each physician will charge the maximum rate in the schedule and will be entitled to payment of this amount.

The fee schedules were negotiated by physicians: six Army physicians and one Navy physician represented the Government in the negotiations. Each officer was assigned a state and negotiated privately with the representatives of that state. No attempt was made by the negotiator to establish any national fee schedule. Those matters that were peculiar were taken into consideration in the development of a fee for each item on the schedule.

We have tried to produce an equitable fee schedule with each state, and believe that the state representatives, as a whole, have been conscientious in their endeavors to arrive at fair and equitable schedules.

**Blue Cross and Insurance Companies.** There have been long discussions concerning the coverage of the hospital part of the program by Blue Cross and the insurance industry. It was considered by Congress that in order that comparison of cost to the Government could be made, there should be competition between these two groups.

Contracts with national Blue Cross covering 31 states, the District of Columbia and the Territories of Alaska, Puerto Rico and Hawaii will be in effect on 7 December 1956. Contracts with Mutual Benefit and Health Association will cover 17 states, also going into effect on that date. (Blue Cross states are Washington, Oregon, California, Idaho, Nevada, Arizona, Utah, Montana, Wyoming, Colorado, New Mexico, Michigan, Ohio, Kentucky, Tennessee, Mississippi, Alabama, New York, Pennsylvania, West Virginia, North Carolina, Virginia, Maryland, Delaware.

Massachusetts, Vermont, New Hampshire, New Jersey, Connecticut, Rhode Island, Maine Mutual Benefit and Health Association states are North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, Texas, Minnesota, Iowa, Indiana, Missouri, Arkansas, Louisiana, Wisconsin, Illinois, Georgia, South Carolina, Florida.)

**Doctors of Osteopathy** A real problem has been presented by the definition of a "physician," which as stated before includes doctors of osteopathy in some states. Medical associations of certain states have objected to furnishing information concerning this program to doctors of osteopathy within their states because they consider that this encourages medical practice which in some instances may be substandard.

**State laws vary considerably.** Doctors of osteopathy in some states may, for example, be fully licensed to practice obstetrics but are not legally authorized to prescribe and administer all drugs and to perform all surgical procedures. In some states they fall within the definition of "physician" while in others they do not, being authorized to practice limited medicine only. Efforts are being made through the state medical licensing agencies to determine who is legally entitled to payment under the law as implemented by the directive, and specifically under the definition of "physician."

**Dental Care** Shortly before the joint directive was promulgated, a provision was included for dental care that is a necessary adjunct to medical or surgical treatment rendered to a dependent who is a hospital inpatient in the civilian part of the program. No representation similar to that with the American Medical Association and state medical associations had been accomplished with those representing the dental profession. It was recognized that this was a small program, nevertheless, it was important and some means were necessary to pay the dentists who might render service under the program in its early stage. As an interim measure pending discussion with the dental profession, it was decided to ask the Blue Shield organization, or whatever fiscal agency was serving the state, to accept bills from doctors of dentistry and forward them to the Executive Director's Office in Washington for adjudication and payment.

Veterans Administration schedules have been in effect for many years, and it was considered that those schedules should be used temporarily in adjudication of the charges received. This plan was submitted to the Secretary of the American Dental Association, who felt that the dental profession should be consulted. Arrangements are being made to have a meeting with representatives of the American Dental Association at an early date, in an endeavor to arrive at some better solution to this problem as quickly as possible.

**General Implementation** We are now in the process of setting up the operational features of the program. Cost and statistical analyses and procedures and methods are being devised that will accumulate information for determining the accomplishments of the program and preparing necessary reports. A liaison group composed of a representative of each of the Surgeons General has been established. These representatives will advise the Executive Director of any changes which should be made in the program to assure that it effectively meets the needs of all the uniformed services.

It is our conviction that this is a most important program insofar as morale within the uniformed services is concerned. Every effort will be made to administer it in a manner which will be mutually acceptable to all concerned.

---

#### UNWARRANTED FANCY OR TOMORROW'S EPIDEMIOLOGY?

There is at present no conclusive laboratory evidence that if large enough populations are screened some degree of resistance to any single chemotherapeutic agent cannot be shown for any given *species*. Fortunately, however, at the present time only a few of the potentially resistant pathogenic organisms present clinical problems. It is certainly not a great extrapolation from available evidence to imagine a transfer of resistance in nature from a resistant carrier strain of low pathogenicity to the more highly pathogenic but apparently less mutable stock which was observed in the laboratory. Further investigation alone will reveal whether this is unwarranted fancy or the basis for tomorrow's epidemiology.

—HENRY P. TREFFERS

in *New Zealand Medical Journal*

p. 568 Dec. 1954

# THE FUNCTIONS OF THE NAVAL NEUROPSYCHIATRIC TREATMENT CENTER

JOHN F. McFALLIN, *Captain MC US*

**T**HE ACTUAL establishment and operation of definitive treatment centers for neuropsychiatric patients in the Navy and Marine Corps is of rather recent origin. In fact, the present two treatment centers have been in operation only some seven years. While not a long time, it certainly is of sufficient length for us to assess their worth, measure their accomplishments, perceive their shortcomings, and plan for their improvement.

## BACKGROUND

Prior to 1948, adequate provision for the care of psychotic patients had been made in institutions outside the Navy. From World War I until 1948 the facilities of St. Elizabeths Hospital in Washington, D. C., were traditionally available for our psychotic patients, and from 1942 to 1949 additional facilities for the treatment of psychotic patients were made available at the Public Health Service Hospital at Fort Worth, Tex. Excellent as these facilities were, the expanding role of Navy medicine dictated the need for the establishment of a Navy Neuropsychiatric Treatment Center.

The first such center was planned as an integral part of the U. S. Naval Hospital at Houston, Tex. Hardly had the plans for this been completed when in December 1948, without prior notice, the new U. S. Naval Hospital at Houston was summarily transferred to the Veterans Administration by Executive Order. Coincidentally, at the same time pressure was being brought to bear to have the Navy provide its own facilities for the considerable number of patients which had accumulated both at St. Elizabeths and at Fort Worth, the Bureau of the Budget having denied the Navy the further use of St. Elizabeths Hospital. The immediate problem was great, but, because plans had long since been formulated for the inauguration of neuropsychiatric treatment centers, these were immediately implemented, with the result that not many months later the first of the centers opened at this hospital, and a short while later the west coast center began opera-

tion at the U S Naval Hospital at Mare Island Since April 1950 the west coast center has been at the U S Naval Hospital Oakland Calif Thus only within the past seven years has there been available within the Navy adequate facilities for the definitive treatment of all types of psychiatric disorders

It seems fitting to pause at this point to say a word about the happy relationship between the Navy and St Elizabeths Hospital That large Federal mental hospital of some 7,000 beds supported directly by money from the Congress has been in many ways the model of a state hospital in which capacity it serves for the District of Columbia In 1909 the Surgeon General of the Navy accepted an invitation from the Superintendent of St Elizabeths Hospital to assign naval medical officers to that institution for training in psychiatry This was the initial step toward a recognition of the need for naval medical officers to have postgraduate training in psychiatry In the ensuing years more and more naval medical officers served on the house staff at St Elizabeths and benefited greatly from the guidance of such men as William Alanson White Kempf, and in more recent years Winfred Overholser Many of us who were witnesses to the excellent care our Navy patients received at St Elizabeths up through 1948 saw the passing of this phase of Navy psychiatry with much regret

In order to better orient ourselves with regard to the strategic goals envisioned for our neuropsychiatric treatment centers it will be helpful to go back some years and quote from an address given in 1949 by the then Chief of the Neuropsychiatric Branch of the Bureau of Medicine and Surgery

The program (for these centers) was to lay emphasis on treatment training and research in all categories of neuropsychiatric conditions It is the Surgeon General's wish that the emphasis would not be considered to be on the psychotic with all the negative connotations associated with those conditions (as in other chronic conditions such as chronic tuberculosis) but in providing an outstanding center for the definitive study and treatment of psychiatric cases which require early intensive inpatient procedures The plan is to provide the center with all of the physical and personnel resources to do an outstanding clinical job This would include an expanded staff of psychiatrists clinical psychologists and social workers in addition to an ample number of trained nurses and other ancillary technician personnel

In transferring this program from Houston to the naval hospitals at Philadelphia and Mare Island it was intended that all of the advantages of the center concept would also be transferred with the ultimate aim of concentrating all inpatient psychiatry at Mare Island and Philadelphia so that psychiatrists assigned to other naval hospitals would then be able to devote an increasing amount

of their time to outpatient consultation and treatment with greater emphasis on the preventive aspects of psychiatry. In the actual operation of this plan psychiatrists stationed at other hospitals on the east and west coasts will determine the needs of their psychiatric patients and if, in their judgment, these patients require consideration or treatment other than that which can be given as an outpatient under each psychiatrist's care, the facilities at the two centers would be available for this purpose. It is visualized that these centers will have available excellent clinicians and every possible resource for providing the very best of modern medicine surgery, and psychiatry.<sup>1</sup>

### PRESNT STATUS

The basic plans for each neuropsychiatric treatment center called for a 250-bed unit functioning as an integral part of the general hospital, but with a certain degree of autonomy. Within a short time, additions had to be made to increase the capacity to about 400 beds. I have had the privilege and the experience of having been Chief of Service at both the east and west coast centers, and have been in the rather unique position of attempting to standardize methods of operation and policies in both these institutions. Having spent the past six years in this capacity, I have come to certain conclusions as to the role or function of these centers. But first, I should like to describe what we are presently doing—i.e., our present functions.

The primary responsibility of a psychiatric hospital is to give good treatment and adequate care to its patients. This is being done at our centers in a manner that would be the envy of many of the nation's leading clinics. The fine facilities for the definitive treatment of neuropsychiatric disorders available today for the men and women of the Navy are in sharp contrast to the lack of such facilities even 10 years ago. We seem to have passed the stage of indifference and callousness that in earlier years dictated a policy of rapid disposition when prompt return to duty was not possible. An attitude of hope and helpfulness—a positive therapeutic attitude—is the by-product of this change from an emphasis on disposition of cases to an emphasis on what can be done to help the patient.

Decisions as to fitness for duty are properly relegated to a secondary role, since such decisions are best made only after we have made every reasonable effort to restore the patient to his former state of health. Every military physician has the usual physician's responsibility to his patient, as well as a responsibility to his command, i.e., to the Navy. It may sound like a paradox, but it has been my experience that the latter responsibility, acquired at a later date when the physician dons a uniform, is taken at times somewhat too heavily, to the detriment of the primary responsibility of physician to patient. In our centers,



all the usual forms of psychiatric therapy are available, including electroconvulsive therapy (ECT) insulin coma therapy (ICT) and both specific and nonspecific psychotherapy

**The Training of Psychiatrists** This is a most important function of our centers, and in this regard our east coast center has established an enviable record in providing both long and short courses of instruction in psychiatry for medical officers. This is a continuing operation that had its inception in World War II when, under the direction of Dr Edward A. Strecker, groups of properly selected medical officers were given a three-months' course in basic neuropsychiatry of sufficient intensity to enable them to handle thereafter many of the routine neuropsychiatric problems encountered in the service. It is a singular fact that a high proportion (55 per cent) of those medical officers continued on in the specialty. Of those who did continue, 89 per cent went on to complete their training requirements in subsequent years and of that group over 35 per cent have gone on to Board certification. The last such group convened in the summer of 1952 and following completion of the four months' course, most have continued on for a two-year period as residents in our several hospitals and have gained the experience and maturity that should enable them to be good clinical psychiatrists. At the present time both our centers provide an approved residency training program for two years in psychiatry and for one year in neurology.

**Professional Growth** In the training of residents per se, the emphasis is heavily on the practical aspects of clinical psychiatry with a view toward achieving the maturity that is best gained by the assumption of responsibility for the patient's care. About maturity we see so much striving for it as an end in itself. Just as no one should set out to be happy so no one should strive to become per se a mature adult. Full maturity usually comes as a kind of bonus to experience and to the performance of one's duties in his career and home. An earnest effort is made to overcome present day tendencies of so overloading psychiatric residents with didactic teaching that their opportunities for the direct study of patients are limited.

The attitudes the resident forms during this critical period of his professional growth are as important as the knowledge and skills required of him. It is important that the resident recultivate some of his former interests in logic and philosophy so that he may maintain critical attitudes toward the nature of evidence, its evaluation, what constitutes knowledge, how it is obtained, and what is the difference between an observed fact and an inference. Our residents show a timidity and reluctance to buck current trends and be bold in their thinking. This is related to their fear of ostracism and nonconformity. Our psychoanalytic

institutes are teaching mostly craftsmanship and are not creating an intellectual climate where freedom of thought or the right to dissent too widely is encouraged."

**Administrative Experience** The residency training program in our Navy neuropsychiatric treatment centers is also putting proper emphasis on the role of medical administration in psychiatric hospital treatment. Certain physicians, new to the practice of hospital psychiatry, are frequently unaware of the necessity and the value of medical administration as part of the medical services. There is a real danger that they may become so obsessed with the individual doctor-patient relationship that they may conjure up all sorts of rationalizations to avoid making administrative decisions regarding their own patients. Such may, for instance, result in that unwieldy, unrealistic situation whereby the patient must have two doctors—one a "therapist," the other an "administrator" to control his privileges, et cetera. Like wise, the doctor's failure to appreciate the broader therapeutic role of the hospital often results in a tendency to overuse the purely medical facilities for treatment (like FCT, ICT, et cetera) and to neglect to use all the other resources of the hospital for rehabilitation. In such instances, we often see a failure to use the particular skills of the recreation worker, the social worker, and the occupational therapist, or a blindness to the tremendous opportunities our nurses have to use the techniques of group therapy in their daily contacts with their patients.

A most significant function of our neuropsychiatric centers has been the training of psychiatric aides, or, as they are termed in Navy parlance, neuropsychiatric technicians. To this end, each of the centers conducts a four months' training course, both didactic and practical, in psychiatric nursing and related subjects. The graduates of these schools have made a most significant contribution toward the betterment of patient care in our centers. Both centers have conducted these training courses in the belief that it is the corpsmen who, spending eight hours or more with the patients each day, can influence, either favorably or unfavorably, the patient's prospects for recovery, rehabilitation, and discharge from the hospital. We have just graduated our 39th class of technicians at this hospital.

#### ANALYSIS OF CASE MATERIAL

To more clearly demonstrate the functions of the center in regard to patient care, it would be helpful to analyze the types of patients seen at the center. For this purpose, we have recently completed a study of 200 cases selected at random from a total of 1,691 psychiatric inpatients discharged from this hospital during the year. The general purpose of this study was to attempt to describe the kinds of psychiatric patients which pass through this

service. Only the highlights of this study will be commented on here, since space precludes giving the results in detail and it is planned to publish these later in a separate article. We were, however, interested in certain data so that we might be in a position to measure some of the results of our treatment program.

In evaluating the results of this study two factors both of which tend to operate against each other must be kept in mind. First it must be remembered that service personnel are a selected population in that all had to meet certain minimum physical, educational and mental standards to enter the armed services. In this sense one might safely postulate that service personnel are by and large healthier and better educated than a random sample of the civilian population. Carrying this a step further, it can also be assumed, for these reasons that psychiatrically ill service personnel are, on the whole healthier and better educated than a random sample of patients admitted to civilian state hospitals. An argument could be made that this population would suffer different kinds of mental disorders and differ from the civilian population in other vital respects. Accordingly, perhaps one should be cautious about comparing the results of this study to the populace at large.

Secondly, this hospital is the treatment center for the east coast and as such the great majority of the patients received here are the more serious cases which could not be disposed of at other medical facilities (e. g. ship dispensary local naval hospitals). In other words by the time a patient gets to this hospital he is in most cases at the last stop of the treatment sequence and following discharge from this hospital, is either ready for discharge from the service or return to duty. The previous two factors do not necessarily cancel each other out, however they should be considered in evaluating the following results.

#### Age

The average age of patients admitted was found to be 23 years with a range between 18 and 48. (It is believed that this population is on the whole younger than the patients admitted to civilian state hospitals.)

#### Sex

Ninety three per cent of the patients admitted were male and seven per cent were female. (It is to be expected that in view of the marked preponderance of males in the service a proportionate number of males would be admitted here. Bureau of Naval Personnel statistics report that the proportion of males to females in the entire Navy and Marine Corps is 98.6 to 1.4 per cent.)

### Education

The average (mean) number of years of education completed was 10.7 years, although the most frequently occurring (mode) level which was reached was 12 years or high school graduation. The 1950 census reports that the average number of years of education for the population of the United States in that year was 9.3 years. Thus, the military patient population appears better educated on the average, than the general civilian population.

### Rank

Seven per cent were officers, 25 per cent were rated enlisted personnel, and 68 per cent were nonrated enlisted personnel. (Statistics obtained from the Bureau of Naval Personnel show the following distribution as of May 1954, throughout the Navy and Marine Corps: 10 per cent officers, and 90 per cent enlisted personnel. A statistically significant difference was found in these figures which indicates that officers are less likely to have psychiatric breakdowns than enlisted men. This seems a logical finding in that officers must undergo a much more rigid selection process.)

### Branch of Service

Seventy-four per cent of the patients were in the Navy, 21 per cent in the Marine Corps, and 5 per cent in the Air Force. (The Bureau of Naval Personnel statistics show the following distribution for the entire naval service: 77 per cent in the Navy, and 23 per cent in the Marine Corps. No statistically significant difference was found in this study which would indicate that either Navy or Marine personnel are psychiatrically hospitalized in greater proportion than would be expected from their numerical ratio in the service.)

### Length of Service

The average length of service of patients admitted to the neuro-psychiatric service was 25 months. Twelve per cent of the patients admitted had less than 6 months' service, 22 per cent had less than 1 year's service, and 48 per cent had less than 2 years' service. 94 per cent of all patients (practically all) had less than 3 years' service. This tends to bear out the contention that psychiatric breakdown in the Navy occurs rarely in personnel with more than 3 years' service.

### Family Constellation

Forty-nine per cent of our patient population had parents living together at the time of their admission to the sick list. Accordingly more than half of all the patients (51 per cent) came from homes which were broken for one reason or another. Statistics on the national average of broken homes are not available but it is reasonable to assume that these patient figures are higher. Whether broken homes are a causative factor in mental illness cannot be

answered by this data. It appears to be symptomatic of all forms of social disorganization (e g delinquency and crime as well as mental illness). It is interesting to note that of the 49 per cent who had parents living together there was a note in 18 per cent of these records of considerable parental dissension.

#### Disciplinary Record

Of the patients admitted to this hospital 26.5 per cent had disciplinary charges in their record (i e they were mentioned in the case history and were either in the past or were pending).

#### Source of Admission

Of the patients 72.5 per cent were transferred from another hospital the greatest source of our admissions.

#### Disposition

Thirty nine per cent of the patients were discharged to their homes 32 per cent were discharged to a Veterans Administration hospital 14 per cent were sent back to duty (12 per cent to full duty and 2 per cent to limited duty) 4.5 per cent were sent back to duty for completion of disciplinary action and 7.5 per cent were returned to the marine barracks. (Of this last group 3.5 per cent were returned for discharge 3.0 per cent for orders and earned leave 0.5 per cent to await return to duty and 0.5 per cent for limited duty with discharge recommended.) Though discharge from the service was indicated and effected in 77.5 per cent of all neuropsychiatric patients it is significant that 68 per cent of all patients discharged were well enough to leave the hospital after an average stay of only some 61 days. This speaks well of the efficacy of early treatment for psychiatric disorders.

#### Final Diagnoses

The following categories included patients whose diagnoses were established and also patients whose diagnoses were undetermined (DU). 59 per cent of all cases admitted came in with a diagnosis of psychosis (55 per cent of all cases were schizophrenics) 16.5 per cent of all patients were admitted with a diagnosis of psychoneurosis 9 per cent of all patients were admitted with character and behavior disorders and 15 per cent of all patients were admitted with other than psychiatric diagnoses.

#### Length of Hospitalization

The average length of hospitalization for all patients on this service was 61 days. Patients on the average spent 17 days at another installation immediately prior to admission here. Consequently the total length of hospitalization for the average patient is 84 days.

### Final Diagnoses

**Psychosis**—46 per cent of all patients discharged from this hospital had diagnoses of psychosis. As to be expected, the schizophrenics totaled 43.5 per cent.

**Psychoneurosis**—13.5 per cent of all patients were discharged with diagnoses of psychoneurosis.

**Character and behavior disorders**—36.5 per cent of all patients were discharged with diagnoses of character and behavior disorders. (On admission, only 9 per cent of patients were diagnosed as having character and behavior disorders, which leads us to the conclusion that as common as these are, they are not as readily recognized and are frequently misdiagnosed as either psychosis or neurosis by many medical officers.)

### Treatment

The treatment given patients on this service could only be grouped in rough fashion. For example, psychotherapy could include not only systematic and intensive psychotherapeutic interviews on a regular basis but more casual contacts as well. Because of the ambiguity of the term and the lack of systematic information in the records, there is no breakdown of this category. This should not be interpreted to mean that psychotherapy was not practiced; on the contrary, there was evidence to indicate that it was used rather extensively. In the following categories, the treatment the patient received both prior to admission to this service and while on this service is noted: 15.5 per cent of the patient population received electro-shock treatment (2.5 per cent prior to admission, 13 per cent after admission); 6 per cent received insulin treatment (less than 1 per cent prior to admission, 5.5 per cent after admission); and 80 per cent received nonspecific treatment.

A rather striking phenomenon observed in our hospitals during these past several years (1951 through 1954) has been the rarity of combat neuroses and the infrequency of any type of psychiatric disorder that could be correlated with combat situations. Those of us who saw hundreds of such cases in World War II now are hard pressed to find even one or two cases for teaching purposes.

### THE FUTURE ROLE OF THE CENTERS

The desirability and feasibility of providing definitive psychiatric care for our Navy and Marine Corps patients in the setting of a military hospital has been amply proved and established by the success attendant upon our efforts in both the east and west coast treatment centers during these past seven years. It seems unlikely and inconceivable that the Navy Medical Department will ever take a backward step and delegate this important phase of treatment to a nonmilitary agency or to Federal or State hospitals. The prognosis in psychiatric disorders not only oc-

pends on the availability of adequate treatment facilities, but is greatly influenced by the familiarity of the setting in which treatment is undertaken

Our military patients have a right to the best treatment available and it has always seemed important to me that it be undertaken so far as is possible in our own military hospitals. For the Navy psychotic patient for example to find himself precipitously transferred to a Veterans hospital or a Federal mental hospital brings with it many undesirable connotations and removes a great many of the emotional supports that come from being taken care of by members of his own service family. A parallel example (and one which we should not emulate) is found in those civilian communities that fail to provide adequate psychiatric care for the population. Ideally our larger urban communities (cities or counties) should provide a much larger share of good treatment and not depend so heavily on the state hospitals. Similarly since the Navy can be looked upon as a community in that its personnel have so many common purposes and characteristics it is the Navy which must itself provide the best of treatment for its personnel at the earliest possible moment in the patient's disorder. As this is achieved we find that a decreasing proportion of our patients require transfer to Veterans Administration hospitals near their homes for continued treatment.

Given somewhat more stability of personnel, our centers are capable of expanding their roles in teaching and training. At the U S Naval Hospital at Oakland for example graduate students in psychology and social work from nearby colleges and universities have secured valuable field placements. This is not only a recognition of the diversity of the case material available but also a tribute to the outstanding program of care given our patients. Likewise it would appear feasible to make the facilities of our centers available for the affiliation in psychiatry for students of adjacent nurses training schools. Serious consideration has recently been given to this phase of expanding the Navy's contribution to the betterment of psychiatric care. At the present time the facilities of this hospital are used by the University of Pennsylvania in the placement of nurses undergoing graduate training in psychiatric nursing.

Research is as yet an area largely untouched by our centers. Much can and should be done. In this regard we have an enviable source of follow ups on those patients who are retired, since they are examined at 18-month intervals under current laws.

### UNSOLVED PROBLEMS

One of the unsolved problems is that of providing proper care for those men and women in the service who require only outpatient treatment for psychoneurotic reactions and minor mal-

adjustments. We have seen repeatedly that inpatient care of such patients is as undesirable in military life as it is in civilian life. Too many such cases are being hospitalized, and we are faced with a dilemma in this regard. A possible solution may be the expansion of outpatient facilities at strategic locations such as receiving stations and naval shipyards, but as always, the demand for such facilities always seems to exceed the supply.

It has likewise been amply demonstrated that patients with character and behavior disorders do not for the most part belong in hospitals, but as a result of tradition in the Navy such patients are sent into our hospital neuropsychiatric services for study, evaluation, and disposition. I say study and evaluation, because we have come to learn that many patients with mild or moderate disorders of this type can and, for the most part, should be returned to duty, and as promptly as possible. Most patients of this type will gladly exhibit in the hospital most of their undesirable personality traits, to the point where the medical officer will be too willing to predict that the man could not perform effective duty. Such predictions may only reflect some of his own impatience and hostility, since we have learned in psychiatry during World War II that we should not be too ready to make bad prognoses regarding the abilities of borderline personnel to do effective military duty.

Nonetheless, until such time as we have extramural psychiatric clinics where personnel can be studied and evaluated, we shall probably have to keep to the present system of hospitalization, which results in discharge of a large percentage by medical survey. I am sure that laxity and loose standards in recommending men for discharge in this manner serves only to increase the number of candidates. On the other hand, if we can be more firm in our adherence to standards regarding discharge, if we maintain an attitude of expectation of better military performance, if we can make definite decisions regarding return to duty promptly, we can prevent a great deal of manpower wastage. Just as the man evacuated from combat back to the Zone of the Interior rarely if ever is salvaged for combat, so also the neurotic or psychopath retained in the hospital past a certain critical short period rarely if ever is salvaged for any kind of military duty.

It has been my purpose to outline briefly the present functioning of our two Navy Neuropsychiatric Treatment Centers and to comment briefly on possibilities for the future. I might better term this article a progress report rather than a terminal report, since we continually need to redefine our goals and to modify them in terms of our estimate of the situation and our shifting strategic goals.



## REFERENCES

- 1 Harris T A. Naval psychiatry in future Presented at the Surgeon General's Conference Washington D C, May 4 1949
  - 2 Caveny E L and Strecker E A. Subsequent nation-wide effect of World War II Navy psychiatric training program. *Arch J Psychiat* 109: 481-485 Jan 1953
  - 3 Bowman K M. Foreword In Solomon J C. *A Synthesis of Human Behavior* Grune & Stratton, Inc New York N Y 1954
  - 4 Finenger J. Personal communication.
  - 5 Romano J. Personal communication.
- 

\*Instead of reasoning that a patient develops a peptic ulcer *because* of emotional tensions we need to understand that the given patient represents a dynamic aggregate that he is affected by forces which alter his dynamic configuration and that we witness such alterations in the totality of his being and in all of its relations. Similarly instead of conceiving the sick person as having regressed to a lower personality level *because* of his illness we need rather to understand that the interplay of forces which makes the patient sick also and at the same time though possibly in different manifest degrees effects that alteration in personality which we label regressive.

—LIGO GILDSTON, M D  
in *Archives of Neurology and Psychiatry*  
p 447 Oct 1955

# ENTOMOLOGIC ILLUSTRATION

At the 406th Medical General Laboratory

HUGH L. KREGAN Major MSC USA

**A**LTHOUGH personnel of the Medical Services of the armed services are encouraged to write articles for publication in professional journals, illustration of such articles is often a problem. Most scientists are not skilled artists, and those fortunate individuals who do possess artistic ability can rarely spare the painstaking hours of labor necessary for production of drawings acceptable for publication. A partial answer to this problem for entomologists of the armed services is provided by the taxonomic section of the entomology department of this laboratory. Eight Japanese artists assigned to the section perform a unique service in preparing drawings of medically important arthropods for publication in professional journals or in Army manuals.

This service had its beginning in 1916, when seven artists were employed by the 207th Malaria Survey Detachment to prepare illustrations of mosquitoes of Japan and Korea. The services of these artists passed to the Malaria Survey Section, 35th Station Hospital, in 1950, and to this laboratory in 1951. Projects for which illustrations have been prepared have been directed by both military and civilian entomologists. Among the latter have been prominent Japanese scientists, staff members of the United States National Museum (Smithsonian Institution), and entomologists under contract with the Office of the Surgeon General, Department of the Army.

Since completion of the earlier projects on mosquitoes of Japan and Korea, artists of this group have illustrated monographs on such subjects as mosquitoes of North America and Guam, parasitic mites found on small mammals in Japan and Korea, mite-biculid mites of Japan and Southeast Asia, fleas and black flies of Japan and Korea, Nearctic black flies, *Culicoides* of Japan, Korea, Okinawa, and Formosa, and ixodid ticks of Japan, Korea, and the Ryukyu Islands (figs 1-4).

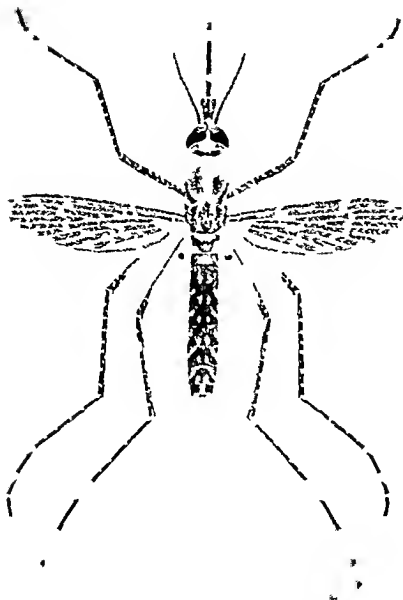


Figure 1 A mosquito of the genus *Ardomyia*

Prerequisites for employment as an artist in this section have been a degree from a recognized Japanese art school or college plus demonstrated ability. Each newly employed artist is given on the job training for about two months in use of microscopes and the camera lucida drawing techniques required in scientific illustration methods of handling specimens, and structure of medically important arthropods. Four of the original seven artists

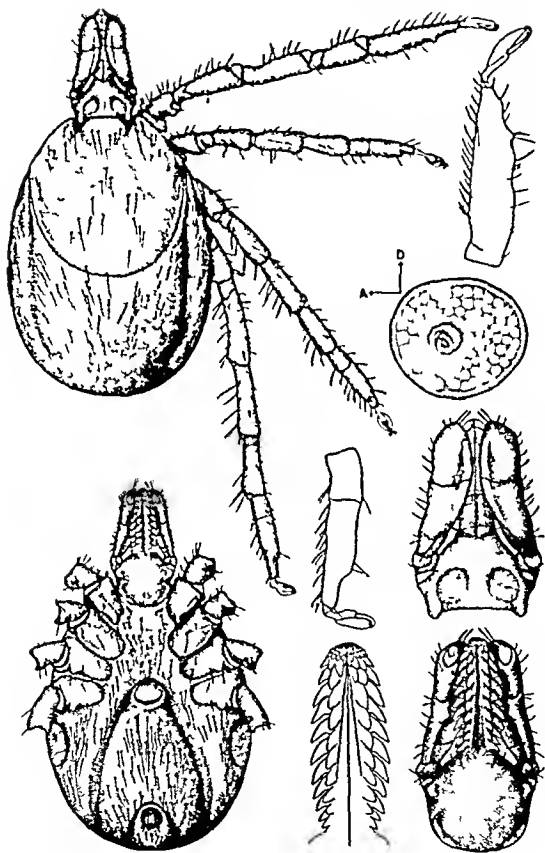
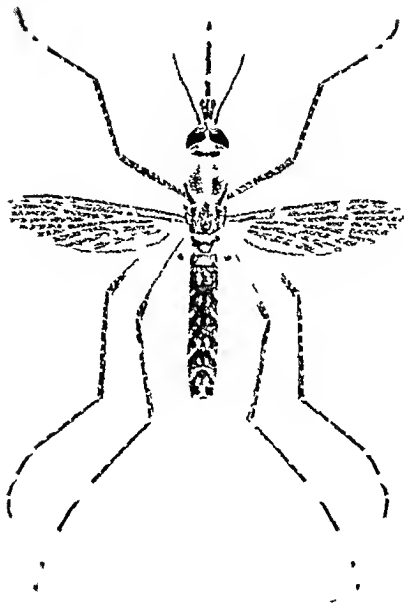


Figure 2 A female tick of the genus *Ixodes*. The letters A and D refer to the position of the spiracular plate (A) anterior (D) dorsal



*Figure 1 A mosquito of the genus Aedomyia.*

Prerequisites for employment as an artist in this section have been a degree from a recognized Japanese art school or college plus demonstrated ability. Each newly employed artist is given on the job training for about two months in use of microscopes and the camera lucida, drawing techniques required in scientific illustration, methods of handling specimens, and structure of medically important arthropods. Four of the original seven artists

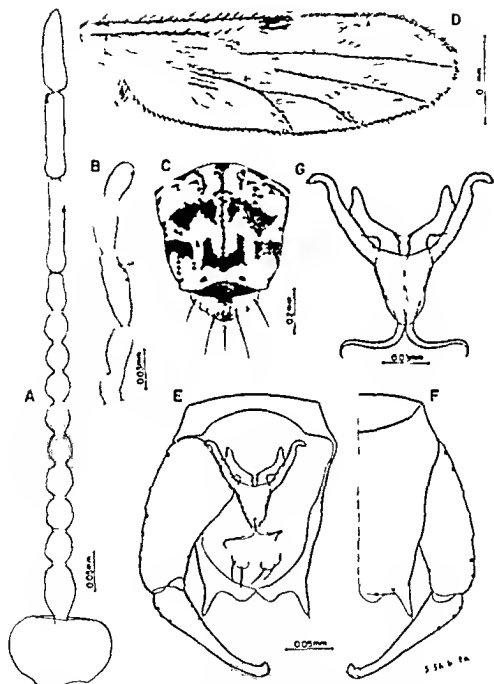


Figure 4 Taxonomically important structures of a blood sucking fly of the genus *Culicoides* (A) antenna (B) palpus (C) dorsal view of thorax (D) wing (E) ventral view of genitalia (F) half of dorsal view of genitalia, (G) aedeagus and parameres ventral view

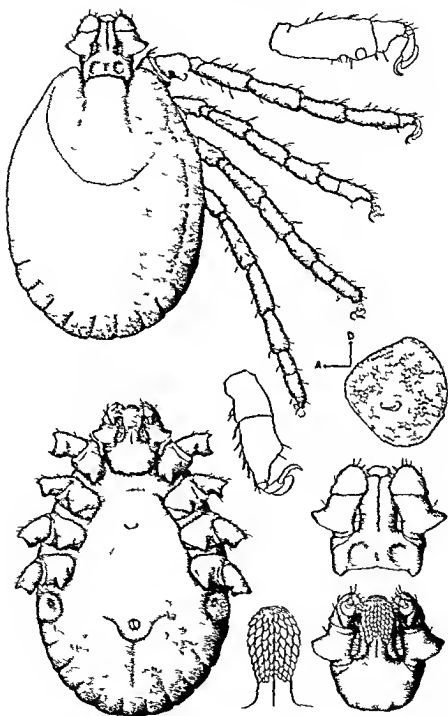


Figure 3 A female tick of the genus *Haemaphysal*. The letters A and D refer to the position of the spiracular plate (A) anterior (D) dorsal.

## CASE REPORTS

### Sickle Cell-Hemoglobin C Disease

With Splenic Infarction Following High Altitude Ascent

WILLIAM M SWEENEY, *Captain, MC USA*

DONALD A CRIPPEN *Lieutenant MC USA*

JOHN F CHRISTIANSON *Major MC USA*

LANCE B COOK, Jr, *Lieutenant Colonel MC USA*

**A**NALYSES of human hemoglobin by electrophoretic techniques has led to the elucidation of several new clinical syndromes. The initial discovery by Pauling and associates<sup>1</sup> that sickle cell hemoglobin (Hb S) is electrophoretically distinct from the normal adult pigment (Hb A) was followed rapidly by the discovery of other abnormal hemoglobins. In 1950, Itano and Neel<sup>2</sup> reported the discovery of hemoglobin C (Hb C), and since then numerous reports<sup>3-11</sup> on patients with mixed heterozygous combinations of sickle cell and type C hemoglobins have appeared. Chernoff,<sup>12</sup> in projecting the incidence of this syndrome in his clinic to the national population, estimated that approximately 10,000 persons in this country have sickle cell hemoglobin C disease. Prior to the discovery of Hb C, many of these patients were considered to have sickle cell trait or mild and atypical sickle cell anemia.

An additional case of this syndrome is the subject of this report.

#### CASE REPORT

A 34-year-old Negro WAF was first seen on the medical service on 15 April 1954. The patient was admitted with complaints of left abdominal pain which was aggravated by coughing, sneezing, and walking. She also had nausea, vomiting, leg pains, and fever. These symptoms began their onset a few hours after a commercial airline flight from Los Angeles to Albuquerque, N. Mex.

History. The patient gave a history of previous similar attacks beginning at 10 to 16 years of age. Three of these attacks were severe enough to require hospitalization. Numerous milder attacks occurred. Joint pains were prominent symptoms in the previous episodes and were diagnosed as "rheumatism" and rheumatic fever. For the next 2 years the patient felt remarkably well. She engaged in strenuous

at Sandia Hospital, Sandia Base, Albuquerque, N. Mex. Dr. Sweeney is now at the Lederle Laboratories, American Cyanamid Co., Pearl River, N. Y.



are still with the section and are now classified as advisors. In figure 5 four of the artists are shown working at desks which they designed.



*Figure 5 Artists working at desks which they designed.*

Specimens to be illustrated often must be dissected or mounted. Choice of the proper technique is essential if taxonomically important structures are to be clearly shown. Because only a few specimens of many species are available, there is little margin for error or faulty judgment in this work. Material for projects on arthropods from Japan, Korea, and the Ryukyu Islands is usually obtained from preventive medicine units or is collected by an advisor or entomologist assigned to this section. These men also review the Japanese literature and maintain liaison with Japanese medical entomologists.

Illustrations for projects concerning arthropods of areas other than the Far East are accepted upon recommendation of higher authority and approval of the Commanding Officer of the laboratory. In the absence of directed priorities, such projects are accepted on a first come first-served basis. Present commitments will keep the artists occupied until at least September 1958. Speed of accomplishment is not an objective here. The unhurried attention to detail, which results in clear and accurate portrayal, is the best assurance that illustrations produced by members of this section will continue to be of high professional caliber.

## Sickle Cell-Hemoglobin C Disease

With Splenic Infarction Following High Altitude Ascent

WILLIAM M SWEENEY, *Captain, MC USA*

DONALD A CRIPPEN *Lieutenant MC USA*

JOHN F CHRISTIANSON *Major MC USA*

LANE B COOK, Jr., *Lieutenant Colonel MC USA*

**A**NALYSES of human hemoglobin by electrophoretic techniques has led to the elucidation of several new clinical syndromes. The initial discovery by Pauling and associates<sup>1</sup> that sickle cell hemoglobin (Hb S) is electrophoretically distinct from the normal adult pigment (Hb A) was followed rapidly by the discovery of other abnormal hemoglobins. In 1950, Itano and Neel<sup>2</sup> reported the discovery of hemoglobin C (Hb C), and since then numerous reports<sup>3-11</sup> on patients with mixed heterozygous combinations of sickle cell and type C hemoglobins have appeared. Chernoff,<sup>12</sup> in projecting the incidence of this syndrome in his clinic to the national population, estimated that approximately 10,000 persons in this country have sickle cell hemoglobin C disease. Prior to the discovery of Hb C, many of these patients were considered to have sickle cell trait or mild and atypical sickle cell anemia.

An additional case of this syndrome is the subject of this report.

### CASE REPORT

A 29 year old Negro WAF was first seen on the medical service on 4 May 1954. The patient was admitted with complaints of left abdominal and flank pain which was aggravated by coughing, sneezing, and walking. She also had nausea, vomiting, leg pains, and fever. These symptoms had their onset a few hours after a commercial airline flight from Kansas City to Albuquerque, N. Mex.

**Post History.** The patient gave a history of previous similar attacks occurring from 10 to 16 years of age. Three of these attacks were severe enough to cause her to be bedridden. Numerous milder attacks occurred. The leg pains were prominent symptoms in the previous episodes and led to the diagnoses of "rheumatism" and rheumatic fever. For the next 10 years the patient felt remarkably well. She engaged in strenuous

---

From U. S. Army Hospital, Sandia Base, Albuquerque, N. Mex. Dr. Sweeney is now at Research Division, Lederle Laboratories, American Cyanamid Co., Pearl River, N. Y.

athletic activity enlisted in the WAF and completed basic training. In 1952 she was transferred to Albuquerque and frequent attacks of left abdominal and flank pain again occurred. When hematuria complicated one of these episodes she was examined at a general hospital where the consultant urologist was unable to demonstrate organic genitourinary disease. However noting sickling on a blood smear he suggested that the hematuria could have been a result of sickle-cell disease.

**Family History.** The patient's mother died of cancer; her father is living. One male sibling died at age 14 from hemorrhage following an appendectomy and another brother died at age 7 of a "heart attack." The patient recalled that as a child she and other members of her family were repeatedly examined for the presence of sickle-cell disease but she was unaware that a definite diagnosis ever had been made.

**Physical Examination.** Examination revealed an acutely ill young Negro woman moderately dehydrated with a temperature of 100 F. There was tenderness to palpation over the left upper abdominal quadrant; the spleen was palpable firm and moderately tender. Slight ankle edema was noted and there was marked tenderness to palpation over the anterior surface of both tibiae. The remainder of the physical examination was normal.

**Laboratory Findings.** Hematologic findings on admission are summarized in table 1. Urinalysis and liver function tests were normal. Roentgenograms of the chest, skull, tibiae, and fibulae were normal. Electrocardiographic findings were within normal limits. Paper electrophoretic study of the patient's hemoglobin revealed mobilities which corresponded to those of S and C hemoglobins present in approximately equal amounts.

TABLE 1 Hematologic data on admission

Red blood cell count	3,550,000 per $\mu$ l
White blood cell count	14,400 per $\mu$ l
Hemoglobin	9.5 gram per 100 ml
Reticulocytes	2.2%
Sickling of red blood cells	present
Target cells	numerous
Platelet count	46,000
Sedimentation rate	4 mm/hr
Osmotic fragility	0.33 to 0.15%
Serum bilirubin, total	2.8 mg per 100 ml
Bone marrow	erythroid hyperplasia

**Subsequent Course.** On symptomatic therapy the patient improved. The anemia and thrombocytopenia which were present on admission gradually disappeared. She was then sent on temporary duty to an installation in New York State where she was in excellent health. In August 1954 the

patient returned by train to New Mexico. She traveled for two days with no difficulty but on reaching the higher altitude of Colorado she developed nausea, vomiting, and left upper quadrant pain. The symptoms progressed in severity and led to her hospitalization when she arrived in Albuquerque. Findings were similar to her first hospitalization. Again the patient gradually improved and she was discharged in November 1954, with a recommendation that she be stationed at a low altitude. This was done and follow up five months later revealed the patient to be entirely asymptomatic.

### DISCUSSION

According to the concept originally proposed by Neel,<sup>11</sup> sickle cell Hb C disease is a heterozygous disease with one parent contributing the gene for sickling and the other contributing the Hb C gene. Sickle cell anemia is the homozygous condition in which a gene for sickling is inherited from each parent. Table 2 summarizes some important differences among the three common sickle cell abnormalities: sickle cell trait, sickle cell anemia, and sickle cell Hb C disease.

TABLE 2 *Comparison of the three common sickle cell abnormalities*

	Sickle-cell trait	Sickle cell Hb C disease	Sickle-cell anemia
Hemoglobin pattern	A + S	S + C	S + F
Incidence (American Negroes)	1/12	1/5,000	1/600
Sickling	present	present	present
Target cells	0-5%	20-85%	5-30%
Anemia	-	- to ++	+++
Crises	-	- to ++	+++
Splenomegaly	-	+	-(adults)
Osmotic fragility	normal	decreased	decreased

Widespread use of electrophoretic techniques has led to the discovery of other abnormal hemoglobins. These have been designated as hemoglobins D, E, G, H, and I. Fetal hemoglobin (Hb F), which is not under the genetic control of the same set of allelic genes that determines Hb A, may persist into adulthood in patients with thalassemia, sickle cell anemia, and other hemolytic anemias.

Sickle cell Hb D disease<sup>12</sup> and sickle cell Hb G disease<sup>13</sup> have also been reported, but evidently are rare conditions. Combination of sickle cell hemoglobin with the remaining abnormal hemoglobins is theoretically possible but has not as yet been reported.

Hb C may exist alone (homozygous Hb C disease) or in combination with normal hemoglobin (Hb C trait). Sickling of erythrocytes is absent but target cell formation is a prominent feature of these conditions.

A definite diagnosis of sickle cell Hb C disease is possible only by electrophoretic analysis of the patient's hemoglobin. However, clinical suspicion should be aroused by the observation of a Negro patient who exhibits symptoms suggestive of "atypical" sickle cell anemia with splenomegaly, sickling, and numerous target cells in the peripheral blood smear.

Although the clinical course of sickle cell Hb C disease is usually milder than that of sickle cell anemia, the disease cannot be regarded as benign. Hematuria, crises with anemia, and splenic infarction resultant from aerial flight, as illustrated in this case history, are common complications. In an analysis of 16 persons with sickle cell Hb C disease, Smith and Conley<sup>10</sup> observed roentgenographic evidence of aseptic necrosis of the femoral or humeral heads in five. The same authors reported severe exacerbations of symptoms during pregnancy and two post partum deaths from hemorrhage. Thrombocytopenia, as observed in our patient, has not been a characteristic finding in the reported cases of this syndrome.

Infarction of the spleen during airplane flight has been observed in six cases of electrophoretically proven sickle cell Hb C disease.<sup>16-18</sup> A clinically diagnosed infarct occurred in our patient after a commercial airline flight. The occurrence of a similar episode in this patient after high altitude land ascent by train (to approximately 5 000 feet above sea level) illustrates the apparent extreme sensitivity of these persons to minor degrees of hypoxia.

#### SUMMARY AND CONCLUSIONS

A case of sickle cell hemoglobin C disease is presented, together with a brief review of the clinical, hematologic, and electrophoretic findings in this syndrome.

Observation of a Negro patient with symptoms of "atypical" sickle cell anemia, splenomegaly, sickling, and numerous target cells in peripheral blood smear should suggest the possibility of sickle cell hemoglobin C disease. The diagnosis can be confirmed by the relatively simple technic of paper electrophoresis.

---

**ACKNOWLEDGMENT** The authors are indebted to William P. Jencks, First Lieutenant MC USAF, Walter Reed Army Institute of Research, for the electrophoretic studies.

#### REFERENCES

1. Paul, L., Itano, H. A., Singer, S. J., and Wells, R. C. Sickle cell anemia: molecular disease. *Science* 110: 543-548, No. 25, 1949.
2. Itano, H. A., and Nel, J. V. New method of human hemoglobin. *Proc. Nat. Acad. Sci. U. S. A.* 36: 613-617, No. 1950.

3 Kaplan E (Ann Harbor Mich) Zuelzer W W and Neel J V A inherited abnormality of hemoglobin and its interaction with sickle cell hemoglobin. *Blood* 6: 1240-1259 Dec 1951

4 Levin W C, Schneider R C, Cull J A and Johnson J L: Family with homozygous hemoglobin C and sickle cell trait: clinical, hematological and electrophoretic study. *J Lab & Clin Med* 42: 918-919 Dec 1953

5 Smith E W and Conley C L: Filter paper electrophoresis of human hemoglobins with special reference to incidence and clinical significance of hemoglobin C. *Bull Johns Hopkins Hosp* 93: 94-106 Aug 1953

6 Ranney H M, Latson D L and McCormack T H Jr: Some clinical, biochemical and genetic observations on hemoglobin C. *J Clin Invest* 32: 177-184 Dec 1953

7 Schneider R C: Paper electrophoresis of hemoglobin as practical method of differentiating various types of sickle cell disease and of hemoglobin C trait. *Texas Rep Biol & Med* 11: 352-365 1953

8 Neel J V, Kaplan E and Zuelzer W W: Further studies on hemoglobin C, description of 3 additional families segregating for hemoglobin C and sickle cell hemoglobin. *Blood* 8: 724-734 Aug 1953

9 Ranney H M: Observations on inheritance of sickle-cell hemoglobin and hemoglobin C. *J Clin Invest* 33: 1634-1641 Dec 1954

10 Smith E W and Conley C L: Clinical features of genetic variants of sickle cell disease. *Bull Johns Hopkins Hosp* 94: 287-316 June 1954

11 Motulsky A G, Paul M H and Durrum F L: Paper electrophoresis of abnormal hemoglobins and its clinical application: simple semiquantitative method for study of hereditary hemoglobinopathies. *Blood* 9: 877-910 Sept 1954

12 Chetani A I: Human hemoglobins in health and disease. (Medical Progress section) *New England J Med* 253: 322-331 Aug 25 1955 365-374 Sept 1 1955 416-423 Sept 8 1955

13 Neel J V: Inheritance of sickle cell anemia. *Science* 110: 64-66 July 15 1949

14 Sturgeon P, Huna H A and Neigsten W R: Clinical manifestations of inherited abnormal hemoglobins: Interaction of hemoglobin-S and hemoglobin-D. *Blood* 10: 387-404 May 1955

15 Schwartz H and Spaet T H: Hemoglobin G: fifth abnormal hemoglobin. *Clin Research Proc* 3: 51-52 Feb. 1955

16 Motulsky A G: Sicklemia (Correspondence section) *J A M A* 155: 368 May 22 1954

17 Smith E W and Conley C L: Sicklemia and infarction of spleen during aerial flight: electrophoresis of hemoglobin in 15 cases. *Bull Johns Hopkins Hosp* 96: 35-41 Jan 1955

18 Motulsky A G, Lutgens W F, Peterson W and Rutter R: Splenic infarction precipitated by airplane flights in patients with sicklemia. *Clin Research Proc* 3: 51 Feb 1955



with a depression of 0.3 cm below the adjacent cortical surface. Attached firmly to such scars were large quantities of perirenal fat and fibrous tissue. On section both kidneys appeared to be atrophic and the parenchyma was greatly thinned. The renal pyramids were flattened and the calyces were greatly dilated. The cortex measured a maximum of 3 mm in thickness and, in areas of extreme thinning, the corticomedullary junction was indiscernible. Both ureters were dilated, tortuous, and elongated.

The surface vessels of the brain were conspicuous and engorged. The leptomeninges were slightly thickened by irregular deposits of grayish white opaque tissue.

*Histological findings.* In both lungs multiple clusters of alveoli were filled by an exudate of polymorphonuclear leukocytes, large mononuclear cells, serum, and a few extravasated erythrocytes. The blood vessels were moderately engorged. Stainable fat was present within small arteries and within alveolar capillaries (fig. 1) and occasionally it was demonstrable within the alveolar lumen. Using Kent's<sup>1</sup> classification this extent of fat embolism was considered approximately 2 plus. Occasionally, fat was found within the cytoplasm of macrophages.



Figure 1 Frozen section of lung showing fat (black) in the lumina of a small artery in the center and a capillary at the margin of the photograph (Oil red O stain,  $\times 350$ )



Sections from the myocardium showed slight fragmentation, vascular engorgement to a slight degree, and occasional fat vacuoles within capillaries. Nearly all of the hepatic cells contained large intracytoplasmic fat vacuoles. A few lobules showed central collections of polymorphonuclear leukocytes. Similar inflammatory cells were noted in the portal areas. Fatty cysts were present (fig. 2).

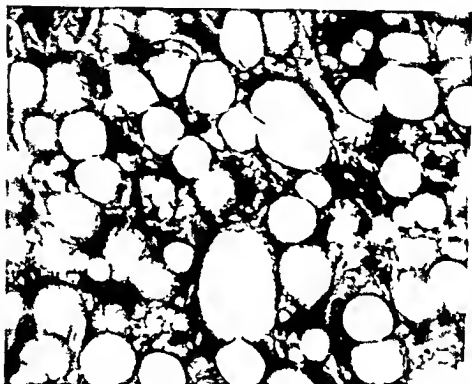


Figure 2. Section of liver showing fatty metamorphosis and fatty cyst formation. (Hematoxylin and eosin stain,  $\times 400$ )

Sections from both kidneys showed irregular areas in which there was a marked increase in interstitial fibrous connective tissue, infiltration by lymphocytes, and replacement of many glomeruli by balls of partially hyalinized fibrous connective tissue. Colloid casts were seen in some of the tubules. Blood vessel walls were moderately thickened due to fibrous tissue proliferation. Occasional glomeruli showed slight pericapsular fibrosis. Stainable fat was present within many glomerular capillary loops and occasionally within small arteries (figs. 3 and 4).

Toxicological examination showed 3.15 mg of ethyl alcohol per gram of brain tissue, or 0.315 per cent. The gastric content showed 10.2 mg of ethyl alcohol per ml of gastric content, or 2 ml in 150 ml of specimen. Gettler and Tiber<sup>2</sup> gave 0.27 to 0.51 per cent as the lethal range of ethanol in brain tissue.

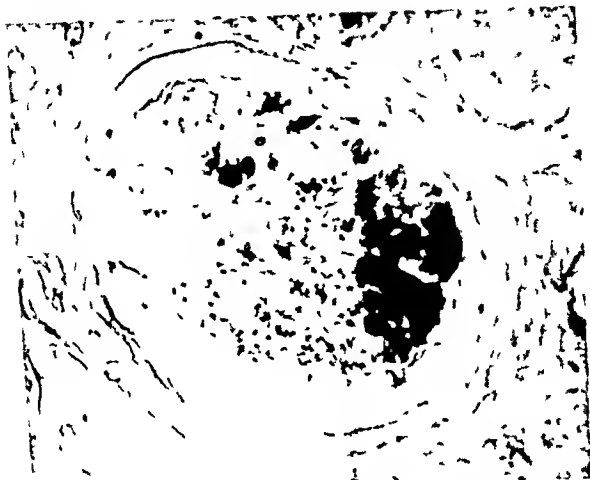


Figure 3 Frozen section of kidney. Fat emboli (black) plug the capillary loops beneath the glomerular capsule on the right (Oil red O stain  $\times 350$ )

#### DISCUSSION

The significance of fat emboli is still debated. Kent studied 53 nondiabetic and nontraumatized adult patients who had come to autopsy. He found a very occasional fat embolus in the lungs of 10 cases. These were multiple in one case. In 53 diabetics, fat emboli were found in the lungs of 24, rare in 19, in more than one location in 2, and in almost every low power microscopic field in 3. He believed that the emboli were of no clinical significance in either group.

Hedren<sup>3</sup> is said to have reported a fatal pulmonary fat embolism in one diabetic patient. Durlacher and associates<sup>4</sup> studied 25 cases of sudden death in persons with alcoholic fatty liver. Five of the deaths were attributed to massive pulmonary fat embolism. Fat emboli in the lungs of three other patients were not thought to be the cause of death. Graham,<sup>5</sup> in reporting a group of young adults with fatty liver and sudden death, did not mention the presence of fat emboli. MacMahon and Weiss<sup>6</sup> found microscopic fat emboli in the pulmonary artery of a patient who died from carbon tetrachloride poisoning.

Sections from the myocardium showed slight fragmentation vascular engorgement to a slight degree and occasional fat vacuoles within capillaries. Nearly all of the hepatic cells contained large intracytoplasmic fat vacuoles. A few lobules showed central collections of polymorphonuclear leukocytes. Similar inflammatory cells were noted in the portal areas. Fatty cysts were present (fig. 2).

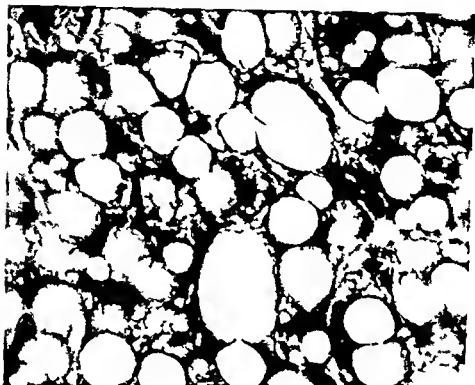


Figure 2. Section of liver showing fatty metamorphosis and fatty cyst formation. (Hematoxylin and eosin stain,  $\times 400$ )

Sections from both kidneys showed irregular areas in which there was a marked increase in interstitial fibrous connective tissue infiltration by lymphocytes and replacement of many glomeruli by balls of partially hyalinized fibrous connective tissue. Colloid casts were seen in some of the tubules. Blood vessel walls were moderately thickened due to fibrous tissue proliferation. Occasional glomeruli showed slight pericapsular fibrosis. Stainable fat was present within many glomerular capillary loops and occasionally within small arteries (figs. 3 and 4).

Toxicological examination showed 3.15 mg of ethyl alcohol per gram of brain tissue or 0.315 per cent. The gastric content showed 10.2 mg of ethyl alcohol per ml of gastric content or 2 ml in 150 ml of specimen. Gettler and Tiber<sup>2</sup> gave 0.27 to 0.51 per cent as the lethal range of ethanol in brain tissue.

They did not consider the possibility of repeated fat embolization from the liver to the kidneys. However, experimental production of fat emboli in choline-deficient rats has resulted in lesions which simulate both the focal and diffuse types of lesions seen in the Kimmelstiel-Wilson syndrome. The liver was considered the probable source of the emboli.<sup>11</sup>

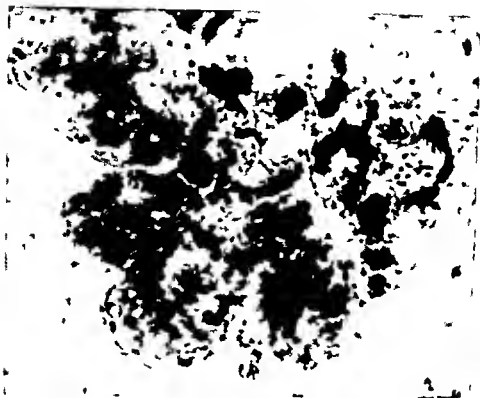
The detection of fat emboli requires foresight of the pathologist, and special handling of the tissue at the time of autopsy. It is to be expected that if it is more frequently sought the lesion will be encountered more often and its importance more accurately defined.

### SUMMARY

The autopsy findings in a man who died suddenly, apparently of acute ethyl alcohol intoxication, included marked fatty metamorphosis of the liver with fatty cyst formation. Microscopic fat emboli were found in the renal, pulmonary, cardiac, and cerebral tissues. These emboli were not thought to have been an important factor in the sudden death of this patient, but do illustrate a probable mechanism by which the fatty liver may produce changes in the kidneys and possibly other viscera.

### REFERENCES

- 1 Kent, S. P. Fat embolism in diabetic patients without physical trauma. *Am. J. Path.* 31: 399-403 May-June 1955.
- 2 Gentler, A. O. and Tiber, A. Qualitative determination of ethyl alcohol in human tissues. *Arch. Path. & Lab. Med.* 3: 75-83 Jan. 1927.
- 3 Hedén, G. Fettembolie och diabetisk linsmi. *Svenska läkarsällsk. förhandl.* 4: 933-946 1916. Cited in reference 1.
- 4 Durlacher, S. H., Meier, J. R., Fisher, P. S. and Lovitt, W. V. Jr. Sudden death due to pulmonary fat embolism in persons with alcoholic fatty liver. (Abstract. Scientific Proceedings, fifty-first annual meeting, American Association of Pathologists and Bacteriologists). *Am. J. Path.* 30: 633-634 May-June 1954.
- 5 Gisham, R. L. Sudden death in young adults in association with fatty liver. *Bull. Johns Hopkins Hosp.* 74: 16-25 Jan. 1944.
- 6 MacLellan, H. E. and Weiss, S. Carbon tetrachloride poisoning with macroscopic fat in pulmonary artery. *Am. J. Path.* 5: 623-630 Nov. 1939.
- 7 Hartroft, W. S. Accumulation of fat in liver cells and in lipodystrophia preceding experimental dietary cirrhosis. *Anat. Rec.* 106: 61-87 Jan. 1950.
- 8 Hartroft, W. S. and Ridout, J. H. Pathogenesis of cirrhosis produced by choline deficiency: escape of lipid from fatty hepatic cysts into biliary and vascular systems. *Am. J. Path.* 27: 951-967 Nov-Dec 1951.
- 9 Popper, H. Liver disease—morphologic considerations. *Am. J. Med.* 16: 98-117 Jan. 1954.
- 10 Patek, A. J. Jr., Segal, D. and Berans, M. Coexistence of cirrhosis of liver and glomerulonephritis: report of 14 cases. *Am. J. Med. Sc.* 221: 77-85 Jan. 1951.
- 11 Hartroft, W. S. Fat emboli in glomerular capillaries of choline-deficient rats and of patients with diabetic glomerulosclerosis. *Am. J. Path.* 31: 381-397 May-June 1955.



*Figure 4 Frozen section of kidney Fat emboli (black) plug the majority of the capillaries of the single glomerulus shown. (Oil red O stain,  $\times 500$ )*

The pathogenesis of the lesion has been well worked out in animals and in man. In working with choline-deficient rats Hartroft<sup>7</sup> and Hartroft and Ridout<sup>8</sup> showed that the liver cells become engorged with fat, the cell wall ruptures, and neighboring cells coalesce to form fatty cysts. These in turn may rupture and discharge globules of fat into the hepatic sinusoids, whence they are carried to lungs, brain, kidneys, and heart. A similar course of events is known to occur in man, but significant embolization of fat apparently is rare.

In the case reported above, we do not feel justified in attributing death to multiple fat emboli. Acute alcohol poisoning was present with lethal tissue concentrations. The fatty liver was certainly the source of the many fat emboli to lungs, kidneys, myocardium, and brain. Fatty liver is a common accompaniment of chronic alcoholism, but may occur with other conditions.<sup>9</sup> The hazard of repeated small emboli to vital organs is probably more important than the risk of significant sudden massive pulmonary embolization, because the latter is so uncommon. Patek, Segal, and Bevans<sup>10</sup> found intercapillary glomerulonephritis to be much more frequent in cirrhotic patients than in the general population.



# Epidural Intracranial Abscess

ROBERT P KOENIG *Captain, USAF (MC)*  
THOMAS K CRAIGMILE *Captain USAF (MC)*

**E**PIDURAL intracranial abscess uncomplicated by other intracranial infection and not associated with osteomyelitis of the skull is uncommon.<sup>1-7</sup> The case reported here is the only one seen at this hospital in the five years it has been in operation, during which period the yearly patient admission rate averaged 20 000.

## CASE REPORT

The patient an 18 year old airman was in good health until 15 June 1955 when he noted the onset of mild right frontal headache. No other symptoms of sinusitis were present. Several physical and neurologic examinations apparently were negative and the patient was treated as an outpatient with mild medication for headache. About two weeks later however he noted the onset of a low grade fever for the first time and a considerable increase in the severity of his headache. That night the patient became acutely ill. His temperature on admission to the local medical facility was over 104°F and he was manic. Neurologic examination revealed no localizing findings. He did not have a stiff neck. Antipyretic therapy and 180 mg (300 000 units) of penicillin were given every four hours.

The following day a spinal tap revealed a pressure of over 300 mm of water. Examination of the spinal fluid revealed 109 lymphocytes per 100 ml, sugar 91 mg per 100 ml and total protein 22 mg per 100 ml. Smear and culture studies were negative as was a blood culture. His white blood cell count was 12 250 per  $\mu$ l with 73 per cent polymorphonuclear neutrophil cells. The blood sedimentation rate was 34 mm/hr. The remaining laboratory studies were within normal limits.

Following the spinal tap the patient noted rather dramatic relief from his headache. Streptomycin sulfate and sulfadiazine (dosage unrecorded) were added to the penicillin he was already receiving. Within 48 hours the patient was asymptomatic. Antibiotic therapy was continued for a total of seven days and then discontinued. Because he remained symptom free and a repeat spinal fluid examination was entirely negative he was discharged on the eleventh hospital day.

---

From U S Air Force Hospital, Sampson Air Force Base, New York City. Received at 475th U S Air Force Laboratory, Minneapolis-St Paul International Airport, Minneapolis, Minn.

The patient remained well until three weeks later when a recurrence of the right frontal headache developed. Neurologic examination on readmission was said to be negative, but the patient was running a low grade fever. Spinal fluid study revealed an initial pressure of 170 mm of water. Ten lymphocytes per 100 ml were present and smear and culture studies again were negative. No medication was given during this hospitalization. Despite a persistent lack of local neurologic findings, the headache and low grade fever persisted and manometric study revealed a steadily increasing spinal fluid pressure up to 690 mm of water.

On 10 September 1955 the patient was transferred to the department of neurology at this hospital where the previously mentioned findings were verified. Agglutination studies, roentgenograms of the skull, and numerous electroencephalograms were normal. Spinal fluid dynamics revealed an initial pressure of 460 and a closing pressure of 100 mm of water. Unfortunately, the laboratory report of studies on this fluid was lost.

Repeat neurologic examinations eventually disclosed a slight but definite papilledema although localizing signs remained absent. A tentative diagnosis of brain tumor or brain abscess was made and the patient was transferred to neurosurgery. A right carotid percutaneous angiogram failed to reveal any definite abnormality (fig. 1). This was followed by ventriculography which demonstrated ventricular displacement to the left as seen in figure 2. A right frontal craniotomy was immediately performed. When the lowermost burr hole situated just above the supraorbital ridge near the mid line, passed through the inner table, thick creamy yellow pus welled up out of the wound. Culture later produced a pure growth of a nonhemolytic coagulase negative staphylococcus organism. An estimated 100 ml of pus was flushed from the wound. A frontal flap was turned and a large well-organized abscess capsule was seen overlying the dura of the frontal pole. A dome-like elevation of the dura was opened but normal appearing brain was encountered. This dural defect was closed after liquid bacitracin was instilled subdurally. A considerable amount of bone in the supraorbital area was rongeuried away and a generous portion of the bone flap was sawed free and discarded. The epidural space was thoroughly debrided and irrigated. Bacitracin solution was instilled therein and the wound was closed. A small rubber drain was left in the epidural space, being exteriorized through a small incision in the scalp flap.

The patient tolerated the procedure very well. He had been given 600 mg (1 000 000 units) of penicillin and 1 gram of streptomycin sulfate at the time of the operation. This was later changed to chlorotetracycline hydrochloride (aureomycin) when sensitivity studies were reported on the staphylococcus organism.

The drain was removed after five days but rather profuse drainage persisted for several weeks. Antibiotic therapy was altered to Chloro-





*Figure 1 Angiogram which failed to definitely reveal the presence of the extradural frontal abscess mass.*

mycetin (brand of chloramphenicol) in accordance with later serum levels. Antibiotic therapy was continued for five weeks.



*Figure 2 Ventriculogram showing ventricular displacement to the left.*

The patient has remained symptom free to date (10 February 1956). Careful study of the bone fragments by the pathology department did not reveal evidence of osteomyelitis.

#### SUMMARY AND CONCLUSIONS

Epidual intracranial abscess without other intracranial infection and without osteomyelitis of the skull is uncommon. In addition, the above reported instance of this disease presented two features which are instructive. It illustrates the difficulty of early diagnosis of epidural brain abscess (1) when there is no overt evidence of a primary source of infection and (2) when the development of intracranial complications of ear and sinus infection is masked and localized by antibiotic therapy.<sup>1,2</sup> The failure to develop even a minimal amount of osteomyelitis of the

skull was probably due to early antibiotic therapy. As is usual in epidural abscesses, a micrococcus (staphylococcus) organism was isolated.

#### REFERENCES

- 1 Cunningham H M. Abscess of brain & ventricles: a study of 100 consecutive cases with some remarks on causes of mortality. *Bull Los Angeles Neurol Soc* 16: 162-173 Apr 1951.
- 2 Erasmus J F P. Cerebral and intracranial pyogenic infection. *South African J Clin Sc* 1: 301-335 Dec 1950.
- 3 Gresser E B. Unilateral exophthalmos and epidural abscess. *Am J Ophthalm* 16: 807-808 Sept 1933.
- 4 Hooper R S. Intracranial abscess following frontal sinus infection. *M J Australia* 1: 756-761 May 26 1951.
- 5 Leopold S. Circumferential purulent meningitis due to frontal sinusitis. *J A. M. A.* 66: 1676-1678 May 27 1916.
- 6 Parnbyek J. Brain abscess following infection of ear and throat. *Ann. Roy. Coll. Surgeons England* 7: 105-127 Aug 1950.
- 7 Skillern R H. Epidural abscess complicating influenza. *Tr Am. Laryngol. Assoc.* 1: 56-65 1922. *Ann. Otol. Rhinol. & Laryngol* 31: 997-1006 Dec 1922.
- 8 Bottrell E H and Drake C. G. Localized pharyngeal abscess and subdural empyema. 1945-1950. *J Neurosurg* 9: 348-366 July 1952.
- 9 Sileo L E. Otitic complications with antibiotic resistance. *Laryngoscop* 65: 170-177 Apr 1955.

#### PSYCHOTHERAPY

There was an Army doctor I once knew who had discovered and practised a very useful therapy for malingerers. He would listen attentively to their imagined symptoms, then examine with an air of increasing gravity some unexpected portion of their anatomy. He was, if I remember rightly, an Irish doctor. He would tell the man to return to duty and report again in three days' time. For if you are no better, I'm afraid there's nothing for it but an operation. And he would lightly describe an operation compared with which the martyrdom of a Christian saint was no more than a summer cold.

—ERIC LINKLATER

in *British Medical Journal*  
p 1519 Dec 24 1955

## Tietze's Syndrome

REYNOLD E. KLAGGS Jr. *Captain USAF (MC)*

**T** IETZE'S syndrome is a nonsuppurative, nonspecific, painful, benign swelling of the costochondral or the sternoclavicular junctions. About 30 years ago it was originally described in the German literature.<sup>1</sup> It seems justifiable to include this condition in the differential diagnosis of chest pain.

As is noted in the literature, this particular syndrome usually occurs in persons between the ages of 18 and 40 years, but it has been reported in individuals as old as 60 years. In the service, both military personnel and their dependents often are seen at the hospital or clinic with the complaint of "pain in the chest." Due to the now recognized fact that cardiovascular changes can occur at any early age and that the public is much more conscious of this, it is incumbent upon physicians to differentiate the serious from the benign conditions that produce chest pain. It therefore seems timely to report a case of Tietze's syndrome observed at this hospital.

### CASE REPORT

A 19-year-old married white woman was first seen in the dependent's clinic on 10 February 1955 because of persistent pain in the upper right chest. The patient stated that she had been perfectly well up until about two months earlier at which time she noted an enlargement in the area that anatomically would be considered the right sternoclavicular joint. For the past month the area had been extremely painful. About one week before she came to the clinic the pain increased in severity. There was no history of falls, blows to the chest, heavy lifting, or wrenching or pulling of the right shoulder girdle. The onset was insidious; the patient first noting tenderness one morning when rolling over on her right side in bed. Upon examining herself in the mirror she saw a slight lump in this area. It was more painful on arising in the morning and on moving the right shoulder girdle and during the day and toward evening the soreness would improve slightly. She used hot Epsom salts compresses to no avail. She had taken no medication orally before coming to the clinic.

skull was probably due to early antibiotic therapy. As is usual in epidural abscesses, a micrococcus (staphylococcus) organism was isolated.

#### REFERENCES

- 1 Cuneo H M Abscess of brain, review of essential pathology in 100 consecutive cases with some remarks on causes of mortality *Bull Los Angeles Neurol Soc* 16: 162-173 Apr 1951
- 2 Et m s J F P Cerebral and intracerebral pyogenic infections *South African J Clin Sci* 1: 301-335 Dec 1950
- 3 Grasser E B Unilateral exophthalmos and epidural abscess *Am J Ophthalm* 16: 807-808 Sept 1933
- 4 Hooper R S Intracranial abscess following frontal sinus infection *M J Australia* 1: 756-761 May 26 1951
- 5 Leopold S Circumcised purulent lymphangitis due to frontal sinusitis *J A. M. A.* 66: 1676-1678 May 27 1916
- 6 Pennybaker J Brain abscess in relation to disease of ear and throat *Ann. Roy. Coll. Surgeons England* 7: 105-127 Aug 1930
- 7 Skillman R H Epidural abscess complicating frontal sinusitis *T Am. Laryngol. Assoc.* 1: 56-65 1922 also *Ann. Otol. Rhinol. & Laryngol* 31: 997-1006 Dec 1922
- 8 Bretterli E H and Deke C. G Localized cephalic abscess and subdural empyema 1945-1950 *J Neurosurg* 9: 348-366 July 1952
- 9 Silcox L E Otitic complications with antibiotic resistance to bacteria *Laryngoscope* 65: 170-177 Apr 1955

#### PSYCHOTHERAPY?

There was an Army doctor I once knew who had discovered and practised a very useful therapy for malingerers. He would listen attentively to their imagined symptoms, then examine with an air of increasing gravity some unexpected portion of their anatomy. He was, if I remember rightly, an Irish doctor. He would tell the man to return to duty and report again in three days' time. For if you are no better, I'm afraid there's nothing for it but an operation. And he would lightly describe an operation compared with which the martyrdom of a Christian saint was no more than a summer cold.

—ERIC LINKLATER  
in *British Medical Journal*  
p 1519 Dec 24 1955

# Tietze's Syndrome

REYNOLD F. FLAHERTY, Jr. *Captain USAF (MC)*

**T** IETZE'S syndrome is a nonsuppurative, nonspecific, painful, benign swelling of the costochondral or the sternoclavicular junctions. About 30 years ago it was originally described in the German literature.<sup>1</sup> It seems justifiable to include this condition in the differential diagnosis of chest pain.

As is noted in the literature, this particular syndrome usually occurs in persons between the ages of 16 and 40 years, but it has been reported in individuals as old as 60 years. In the service, both military personnel and their dependents often are seen at the hospital or clinic with the complaint of "pain in the chest." Due to the now recognized fact that cardiovascular changes can occur at any early age and that the public is much more conscious of this, it is incumbent upon physicians to differentiate the serious from the benign conditions that produce chest pain. It therefore seems timely to report a case of Tietze's syndrome observed at this hospital.

## CASE REPORT

A 19-year-old married white woman was first seen in the dependent's clinic on 10 February 1955 because of persistent pain in the upper right chest. The patient stated that she had been perfectly well up until about two months earlier at which time she noted an enlargement in the area that anatomically would be considered the right sternoclavicular joint. For the past month the area had been extremely painful. About one week before she came to the clinic the pain increased in severity. There was no history of falls, blows to the chest, heavy lifting or wrenching or pulling of the right shoulder girdle. The onset was insidious, the patient first noting tenderness one morning when rolling over on her right side in bed. Upon examining herself in the mirror she saw a slight lump in this area. It was more painful on arising in the morning and on moving the right shoulder girdle, and during the day and toward evening the soreness would improve slightly. She used hot Epsom salts compresses, to no avail. She had taken no medication orally before coming to the clinic.

---

From U. S. Air Force Hospital, Hunter Air Force Base, Ga.

Her past history was noncontributory. She had the usual childhood diseases except mumps. She had had no operations and had borne no children. She had always been in excellent health. There was no family history of tuberculosis, diabetes mellitus, or other familial diseases.

Physical examination on admission revealed a well-developed, well-nourished white woman in no acute distress. Temperature was 98.6°F, pulse rate 88/min, respiration 20/min, blood pressure 120/74 mm Hg. There was a firm, slightly tender, bulbous mass at the right sternoclavicular joint. The patient was able to move the right shoulder girdle in all directions without limitation. The mass was about 2 by 3 cm, smooth, and slightly raised. It was not movable, and there was no crepitation. There was no evidence of dislocation of the right shoulder girdle or sternoclavicular joint. The lungs were clear to auscultation and percussion. The heart tones were of good quality, sinus rhythm was regular, and no shocks, thrills, murmurs, or accentuation were noted. The remainder of the physical examination was within normal limits.

The laboratory studies revealed a red blood cell count of 4,500,000/ $\mu$ l, hemoglobin 15 g/100 ml, and white blood cell count 10,500/ $\mu$ l with 92 per cent neutrophils. Sedimentation rate was 20 mm per hour (Wintrobe). The serologic test was negative. Blood urea nitrogen was 15 mg/100 ml, and total protein was 7.5 g/100 ml (albumin 4.5, globulin 3.0). Urinalysis was negative for sugar and bile, and the microscopic examination was negative. Prothrombin concentration was 100 per cent of normal, fasting blood sugar 110 mg/100 ml, calcium 9.5 mg/100 ml, uric acid 3 mg/100 ml, cholesterol 200 mg/100 ml, and inorganic phosphorus 4 mg/100 ml. Chlorides were 104 meq/l, sodium 140 meq/l, and potassium 4.5 meq/l. Liver function tests were within normal range. The electrocardiogram, consisting of all 12 leads, was reported as being within normal range. Roentgenograms of the chest and the right sternoclavicular area were within normal limits.

The patient was given no medication. During the next few weeks the lesion decreased in size, and on the next to last visit there was a very slight residual tenderness upon deep pressure. On her last visit, about six weeks after the first, there was no discomfort either on digital pressure or as a result of right shoulder girdle motion. Physical examination was entirely negative, and there was no evidence that there had been a lesion in this area.

### DISCUSSION

The patient with Tietze's syndrome usually complains of a painful sensation in the chest area. The discomfort may be vague, nondescript, and diffuse or fairly well localized. The patient may describe it as a heavy weight that seems to be pushing

in on the chest, or it may be described as only a soreness which is present on deep respiration. The intensity of the pain may be more severe at different times of the day. Several factors, including anxiety, weather, type of work, infection, et cetera, apparently aggravate the condition.

Tietze's syndrome should be considered in the evaluation of chest pain because of the similarity of its symptoms to those of many different organic diseases. The differential diagnosis should include such serious conditions as carcinoma of the lung or breast and any of the serious cardiac conditions that might mimic the pain of Tietze's syndrome. Truism in any form should be ruled out by history, physical examination, and roentgenograms.

Hodgkin's disease should be considered in the differential diagnosis because it may produce sternal swelling at the level of the second and third intercostal spaces as a result of involvement of the nodes along the course of the internal mammary artery.<sup>2</sup> However, in Hodgkin's disease there is no sternal tenderness, in contrast to the painful condition found in Tietze's syndrome. Osteochondritis can be differentiated radiologically,<sup>3</sup> mumps with presternal edema can be differentiated for it is not tender and usually lasts only five days.<sup>4</sup> All of these characteristics are quite different from those found in the swelling of Tietze's syndrome.

Following the exclusion of a serious lesion two other conditions which should be thought of in relation to chest pain from a superficial cause are slipping rib<sup>5</sup> and nerve nipping at the intercostal margin. These can generally be differentiated by careful physical examination and should cause no confusion.

Reports of the microscopic characteristics of the lesion are inconsistent and indefinite. Biopsy specimens may show thickening of the perichondrium, muscle fasciculi, and/or ligaments surrounding the costochondral junction, and at times an enlargement of cartilage around the joint involved. All of the reports indicate an absence of inflammatory change in cartilage and surrounding soft tissue. It is believed that all of the reported histologic changes could be normal variations of the costal cartilage.

On examination the findings are limited to the areas about the involved costochondral or sternoclavicular junctions. As was noted in this case report there is usually a tender, fusiform, or bulbous swelling involving the soft tissue, cartilage, or bone. The skin above the involved area is not changed or discolored, and there is no crepitation nor pitting edema. Radiologic findings of significance are rarely noted.



The course of the disease varies according to the reports \* It may be long and varied with remissions and exacerbations or it may be quite short a matter of days or weeks

The treatment is entirely symptomatic and consists of local application of heat, the use of salicylates for pain, and if necessary infiltration with a local anesthetic The patient should be reassured that the condition is benign that it will heal in time, and that no residual damage is anticipated

This case report is typical of those recorded in the literature The onset was insidious, and there was no apparent cause of the lesion No treatment was given and after about four months the patient was asymptomatic and physical examination was normal

### SUMMARY

A case of nonspecific painful swelling of the sternoclavicular joint has been presented as an example of Tietze's syndrome The cause of this condition is unknown and it has a variable and often prolonged and fluctuating course Since this syndrome is not believed to be rare, it should be considered along with more serious disorders in the differential diagnosis of chest pain It is of particular importance that these patients be reassured of the benign nature of the disorder

### REFERENCES

1. Tietze A Ueber eine eigentümliche Häufung von Fieber mit Dysmorphie der Rippenknorpel *Altn. Wechnsch.* 58 879-881 July 25 1921
2. Scher K Sternum swelling as preterminal sign of Hodgkin's disease *Brit. M. J.* 2 824 Nov 6 1948
3. Gellis S S and Peters M Mumps with pericarditis *Bull. Johns Hopkins Hosp.* 75 241-250 Oct 1944
4. Davies-Cole R Slipping rib *Brit. M. J.* 1 432 Mar 18 1922
5. St Venso F H Nerve supply of the intercostal margin *Lancet* 2 969-970 Nov 24 1951
6. Dwyer E H W Costochondritis (Tietze's disease) *Lancet* 1 883-884 Apr 21 1951

## Departments

### A MESSAGE FROM THE A M A

With the 85th Congress convening this month, the American Medical Association will continue to be kept busy following congressional activity, particularly in areas concerning medicine and public health. There has been an increase in the total measures introduced and laws enacted in the last two Congresses. Medical and health bills, as well as enacted laws, likewise increased. The following table indicates the extent of these activities:

Legislation	83d Congress (1953-1954)	84th Congress (1955-1956)	Increase (Per cent)
Measures introduced			
Total	16,372	19,039	16
Concerning medicine	407	571	40
Public laws enacted			
Total	781	1,028	31
Concerning medicine	20	26	30

When the 84th Congress completed its second and final session on 26 July 1956, over 19,000 measures had been introduced. The Association analyzed and closely followed 571 of these bills which had medical or health implications. Most of the 26 medical measures which became law were supported by the Association by oral or written statements presented to the committees or members of Congress.

The Association opposed two measures which became public laws in 1956. One amended the Social Security Act by establishing a disability cash benefit program for persons between ages 50 and 65; the other authorized medical corps commissions for osteopaths in the armed services, but on a permissive basis.

There were six military medical laws enacted by the 84th Congress. Two were enacted in the first session and four in the second session. It is believed that medical officers will be interested in the following general summary of these laws.

Public Law 118, 30 June 1955, extended the Doctor Draft Act for two years until 1 July 1957, which the Defense Department

From the Council on National Defense of the American Medical Association. The views and opinions expressed are not necessarily those of the Department of Defense.  
—Editor

claimed was essential to get enough physicians to maintain high standards of medical care for military personnel. It also extended for four years, the \$100 a month equalization pay for physicians and others on active military duty. Reflecting some of the objections of the American Medical Association in opposing an extension of the Doctor Draft Act, it amended the law by (a) lowering the age limit for call up of special registrants from 51 to 46 years of age, and (b) exempting from induction special registrants over the age of 35 who had previously applied for commissions as medical or dental officers in one of the armed services if they had been rejected solely on the basis of a physical disability.

The Department of Defense has indicated to the Association that it will not seek an extension of the Doctor Draft. Legislation has been proposed to amend the basic Universal Military Training and Service Act to provide for the selective call up of physicians along with others who have general draft liability. Under the present basic draft act physicians who have been deferred beyond age 26 to complete their medical education are liable for service up to age 35. The proposed legislation is designed to provide for an orderly call up of these deferred physicians.

Public Law 294 9 August 1955 authorized reserve commissions for the first time for male nurses in the armed services. The A M A took no position on this legislation.

Public Law 402 27 April 1956 authorizes the President to make the U S Public Health Service a military branch in time of emergency involving the national defense. Prior to this such status was permissible in time of war but not in time of emergency. The Public Health Service considered this change necessary to discharge adequately its new civil defense responsibilities. After the Surgeon General of the Public Health Service assured the Association that the proposed legislation would not be used for the purpose of placing calls for civilian physicians with the Selective Service System in time of national emergency, the American Medical Association then supported the measure.

Public Law 497 30 April 1956 was designed to increase the career attractiveness of military medicine. In addition to the \$100 a month equalization pay medical officers under the law receive an additional increase in pay of \$50 at the end of 2 years service, another \$50 at the end of 6 years service and another \$50 at the completion of 10 years service. The original version of the bill provided for the first pay increase at the end of 3 years. As finally enacted it included the A M A recommendation for an increase at the end of 2 years. Another A M A recommendation not included in the law called for an increase

in the amount of special pay to more nearly equalize military salaries with the salaries offered physicians of equal training and experience as civilian employees of the government.

Other features of the law provide for longevity pay credit for the 1 postgraduate year spent in medical schools and for the 1 year spent in medical internship, as well as upgrading of officers now on the active list to reflect the 1 year increase of constructive service credit.

Public Law 569, 7 June 1956, authorizes a uniform program of medical care for members of the uniformed services and their dependents. The Dependents' Medical Care Act authorizes medical care of all military dependents in military facilities subject to availability of space facilities, and capabilities of staff. The Secretary of Defense is authorized to arrange for medical inpatient care for spouses and children of active duty personnel in civilian medical facilities. The civilian facilities may be limited or prohibited in any area where it is determined that military facilities are adequate to care for the service families. Charges in military facilities are limited to subsistence and in hospital charges, together with uniform, minimal charges for outpatient care. In private facilities, the charges will be at the same rate or the first \$25 whichever is the larger. The law defines "military dependents," as well as the types of benefits provided in military and in civilian facilities. In supporting this program and pledging its complete cooperation, the A M A urged that increased emphasis be placed on the utilization of civilian facilities and the services of civilian physicians.

Public Law 763, 24 July 1956, is a permissive law authorizing the appointment of osteopaths as medical officers in all the military services. The American Medical Association opposed this measure, because it believed that the appointment of osteopaths as medical officers would endanger the health and welfare of military personnel, would contribute to the demoralization of the career services, would endanger the accreditation of residencies and internships in military hospitals, and would unnecessarily hinder the utilization of civilian consultants and other civilian physicians.

claimed was essential to get enough physicians to maintain high standards of medical care for military personnel. It also extended, for four years, the \$100 a month equalization pay for physicians and others on active military duty. Reflecting some of the objections of the American Medical Association in opposing an extension of the Doctor Draft Act, it amended the law by (a) lowering the age limit for call up of special registrants from 51 to 46 years of age and (b) exempting from induction special registrants over the age of 35 who had previously applied for commissions as medical or dental officers in one of the armed services if they had been rejected solely on the basis of a physical disability.

The Department of Defense has indicated to the Association that it will not seek an extension of the Doctor Draft. Legislation has been proposed to amend the basic Universal Military Training and Service Act to provide for the selective call up of physicians along with others who have general draft liability. Under the present basic draft act, physicians who have been deferred beyond age 26 to complete their medical education are liable for service up to age 35. The proposed legislation is designed to provide for an orderly call up of these deferred physicians.

Public Law 294, 9 August 1955, authorized reserve commissions for the first time for male nurses in the armed services. The A. M. A. took no position on this legislation.

Public Law 492, 27 April 1956, authorizes the President to make the U. S. Public Health Service a military branch in time of emergency involving the national defense. Prior to this, such status was permissible in time of war but not in time of emergency. The Public Health Service considered this change necessary to discharge adequately its new civil defense responsibilities. After the Surgeon General of the Public Health Service assured the Association that the proposed legislation would not be used for the purpose of placing calls for civilian physicians with the Selective Service System in time of national emergency, the American Medical Association then supported the measure.

Public Law 497, 30 April 1956, was designed to increase career attractiveness of military medicine. In addition to \$100 a month equalization pay, medical officers under the law receive an additional increase in pay of \$50 at the end of 3 years' service, another \$50 at the end of 6 years' service, and another \$50 at the completion of 10 years' service. The original version of the bill provided for the first pay increase at the end of 3 years. As finally enacted, it included the A. M. A. recommendation for an increase at the end of 3 years. Another A. M. A. recommendation not included in the law was for an increase at the end of 6 years.

The group studied nutritional problems and dietary deficiencies in France, Greece, Turkey, Lebanon, French Morocco, Iran, Pakistan, Eritrea, Ethiopia, and Libya. At Teheran, Iran, the committee met with the Surgeons General of Iraq, Turkey, Iran, and Pakistan to discuss nutritional problems in those countries.

While on the trip the committee also reviewed medical care provided for U. S. Military Assistance Advisory Group (MAAG) in the areas visited.

---

## DEATHS

**BARCLAY** Robert Maxwell, Lieutenant Colonel DC USAR of Glenshaw, Pa., stationed at 665th Medical Detachment, Korea, graduated in 1938 from Northwestern University Dental School, commissioned a First Lieutenant 8 October 1940 and ordered to active duty 1 July 1942; released from active duty in 1945 and returned to active service 13 October 1953; died 6 October 1956, age 44, in Korea of acute anterior myocardial infarction.

**YOUNG** Grayce Esther, First Lieutenant ResAF (AFNC) of Warden, Ohio, stationed at 4457th U. S. Air Force Hospital, Sewart Air Force Base, Tenn., graduated in 1949 from Saint Vincent & Charity Hospital School of Nursing, Cleveland, Ohio; ordered to active duty 5 August 1955; died 26 October 1956, age 28, in an aircraft accident.

---

**ERRATUM** The legend under the illustration on page 1830 of the December 1956 issue of this *Journal* should have shown Vice Admiral Roque A. Saldias as President of the Council of Secretaries instead of as Secretary of the Navy of Peru.—Editor

## COMMITTEE ON NUTRITION VISITS EUROPE AND MIDDLE EAST

Members of the Committee on Nutrition for National Defense recently completed a survey of countries in Europe and the Middle East. Dr. Frank B. Berry, Assistant Secretary of Defense (Health and Medical) and Chairman of the Committee, was accompanied on the 28-day tour by Rear Admiral Bartholomew W. Hogan, MC, USN, Surgeon General, U.S. Navy; Major General James O. Gillespie, MC, USA, Office of the Surgeon General, Department of the Army; Major General Harry Armstrong, USAF (MC), Surgeon, Air Force Europe; Dr. Arnold E. Schaefer, Deputy Director, Interdepartmental Committee on Nutrition for National Defense; Dr. Joseph S. Butts, Oregon State College, Corvallis, Ore., consultant to the Interdepartmental Committee; Dr. Olaf Mickelsen, National Institutes of Health, Bethesda, Md.; Dr. Richard A. Kern, Temple University Hospital, Philadelphia, Pa.; and Dr. Edward D. Church, Jr., John Homans Professor of Surgery, Harvard Medical School, Boston, Mass.



*Committee arriving in Washington, D. C., on their return from the Middle East. From left to right: Dr. Arnold E. Schaefer, Major General James O. Gillespie, MC, USA, Lieutenant Commander Thomas L. Hollis, MSC, USN, Rear Admiral Bartholomew W. Hogan, MC, USN, Dr. Joseph S. Butts, Lieutenant James W. Staudacher, USA, Dr. Frank B. Berry, Dr. Edward D. Church, Jr., Dr. Richard A. Kern, Dr. Olaf Mickelsen.*

Serman Prize for his article "Radiation Injuries Resulting from Nuclear Explosion and Fallout" which was published in the April 1956 issue of *Military Medicine*

The Stitt Award was presented to Lt Colonel Edwin J Pulaski MC USA, for his contributions in antibiotic research especially the use of antibiotics in burns



*Admiral Arthur W. Radford USN Chairman Joint Chiefs of Staff giving address at Association meeting*

The McLester Award for outstanding work in nutrition and dietetics was received by Captain Elinor Pearson AMSC for her metabolic studies of severely burned patients

Winners of the Founder's Medal were chosen by the Executive Council of the Association from members who have made outstanding contributions to military medicine and performed meritorious service to the Association. Those who received the medal for 1956 were

Major General George E. Armstrong USA (Ret.), former Surgeon General of the Army (1951-1955) now Director of New York University Bellevue Medical Center New York N. Y.

Captain Eugene V. Jobe MC USN Bureau of Medicine and Surgery Department of the Navy Washington D. C.

Captain Walton L. Jones MC USN Bureau of Medicine and Surgery Department of the Navy Washington D. C.



## BOOKS

### Reviews of Recent Books

**ADVANCES IN INTERNAL MEDICINE** Volume VIII edited by William Dock M D and I Snappe M D 366 pages illustrated The Year Book Publishers Inc Chicago Ill 1956 Price \$9

This eighth of a series deals with eight subjects in review form of which some are universal in interest and others more or less exotic in nature

**Disorders of Esophageal Motor Functions** by F J Ingelfinger is a lucid presentation of the anatomy and physiology of the esophagus Based on this data a realistic therapeutic approach has been formulated

**Peptic Ulcer Review of Recent Literature Pertaining to Etiology Pathogenesis and Certain Clinical Aspects** by J B Kirsner R S Kassriel and W L Palmer gives an excellent summary of the literature for the past five years The review of incidence the role of hydrochloric acid and the relations of serotonin and reserpine plus the problem of massive gastro intestinal hemorrhage are interestingly discussed Clinical indications for transfusions and surgical intervention are clearly given A reasonable conservative approach to the problem of gastric ulcer is offered

**Digitalis and Potassium** by B Lown is a key paper for anyone undertaking the treatment of cardiac patients Potassium metabolism is explained and factors enhancing myocardial sensitivity to digitalis following potassium deficit are enumerated Finally the interrelations of calcium potassium and digitalis are shown

J A Luetscher Jr discusses Aldosterone its pharmacologic actions extraction and measurement on body fluids and physiologic effects of its administration

**Adrenalectomy and Hypophysectomy in the Treatment of Advanced Cancer** by O H Pearson provides a brief resume of the subject In the case of carcinoma of the breast relationship of adrenalectomy to response to oophorectomy and androgen therapy is shown Preliminary results of hypophysectomy for breast cancer indicated about an over all 50 per cent improvement A program for hormone replacement therapy during and after adrenalectomy and hypophysectomy is given

**Chemotherapy of Tuberculosis** by W F Russell Jr S H Dressler and G Middlebrook is a review of antimicrobial action of drugs parasite susceptibility and drug resistance A most interesting facet presented is that of the prophylaxis of primary tuberculosis

H. A. Schroeder presents papers on "Trace Metals and Chronic Diseases." Five trace metals believed essential for mammalian metabolism—manganese, copper, cobalt, zinc, and molybdenum—are discussed. The possible relation of trace metals to chronic diseases such as hypertension, atherosclerosis, disseminated lupus, and others is suggested.

R. Janet Watson presents "Hemoglobins and Disease" and discusses 11 hemoglobins other than the normal. Seven combinations with normal hemoglobin resulting in a symptomless trait and 14 combinations with other abnormal genes resulting in pathologic conditions are presented.

The best portion of this book, at least for the inquisitive reader, is the extensive bibliography to be found at the end of each review.

—ARCHIE A. HOFFMAN, Col. USAF (MC)

**ROENTGEN INTERPRETATION** by George W. Holmes, M.D., and Laurence L. Robbins, M.D. 8th edition. 525 pages. 371 illustrations. Lea & Febiger, Philadelphia, Pa. 1955. Price \$10.

For those in the early stages of training in radiology, this modest-sized text can perform an important service. The authors do not attempt to be encyclopedic or exhaustive, and by so doing they are able to present basic ideas in relatively brief form. All too often, sometimes, the student bogs down in a massive text or in the periodical literature and is unable to see the forest for the trees. At such times the eighth edition of this well-known work can furnish a quick and lucid re-orientation.

In condensing the material, the authors have avoided the temptation to outline and list classifications. Instead, they adhere to a straight expository style with a smooth flow of ideas from one topic to the next. The illustrations are aptly chosen and the technique of reproduction is of the highest quality.

The first chapter on "Confusing Shadows and Artefacts" has much to recommend it to the beginner. Following this introductory effort, the writers successively discuss radiology of bones, joints, chest, and gastro-intestinal and genito-urinary tracts. The final chapter covers fluoroscopic technique and radiation protection.

Within the limits which the book sets for itself with respect to space and expense, it is fair to say that the stated objective—"to present the essentials"—is admirably accomplished.

—JAMES T. BRENNAN, Lt. Col. MC USA

**Williams OBSTETRICS** by Nicholson J. Eastman. 11th edition. 1,212 pages, illustrated. Appleton-Century-Crofts, Inc., New York, N.Y. 1956.

The 11th edition of this book is the most up-to-date obstetrical text book available. The editor has made many major revisions and deleted much outdated material. Dr. Louis M. Hellman revised several sections, including anesthesia and analgesia, uterine inertia, and rupture of cesarean section scars. An excellent chapter on the psychiatric aspects of pregnancy and childbirth is presented. The book has

attractive to the reader by addition of many excellent new illustrations several of which are in color. The new material presented on Rh in compatibility is excellent. There are new or improved sections on fibrinogenopenia postmaturity hypotensive drugs retrolental fibroplasia adrenocortical hormones and management of habitual abortion. The section on iron metabolism and anemia in pregnancy and the treatise on the toxemias of pregnancy are attractive presentations. The bibliography has been brought up to date and is quite extensive.

As an obstetric text it is unsurpassed it not only appeals to the student intern and resident but is especially satisfactory to the teacher general physician and the specialist — *J WILSON HUSTON Capt MC USN*

**TECHNIQUES AND PROCEDURES OF ANESTHESIA** by *John Adriani M D*  
2d edition 508 pages illustrated Charles C Thomas Publisher Springfield Ill 1956 Price \$8.75

Dr Adriani has revised the original 1947 edition by several additions and has deleted techniques which have not proved useful. The text consists of nine parts totaling 535 pages which cover the field of anesthesiology. Included in these nine chapters are selections on anesthesia specialized procedures and resuscitation and inhalation therapy. Each part is devoted to the methods and uses of those agents under discussion. Complications of anesthesia are discussed in a separate chapter while the short appendix offers tables of ordinary laboratory values and cardiac hemodynamics.

The text is unusual as it presents information in outline form with check lists for almost any situation. These check lists cover in precise fashion indications and contraindications advantages and disadvantages premedication methods and techniques. Selection of anesthesia is covered in a table indicating problems encountered or anticipated choice of agent and choice of technical procedure.

The book is well illustrated and adequately referenced and the author suggests its use by beginners. I believe this work also merits the attention of the expert who desires a time saving reference and would recommend it for the library of all practicing anesthesiologists.

—*ROBERT F. CORWIN Col USAF (MC)*

**PHYSICAL DIAGNOSIS** by *Ralph H Mayo M D* and *Mahlon H Delp M D*  
5th edition 358 pages illustrated W B Saunders Co Philadelphia Pa 1956 Price \$7

This is a revised edition of a widely used textbook in physical diagnosis. It includes for the first time Dr Mahlon H Delp as the co author.

There are sixteen chapters and an interesting introduction includes a brief history of physical diagnosis and its major contributors. The book is so subdivided and classified that it may be studied as a text in the order written or in any desired fashion. It is recommended reading for all practitioners of medicine but not intended as a reference book or encyclopedia. Possibly for this reason details and discussion of the

fundamentals and methods of palpation percussion and auscultation at times have been excessively abbreviated. This is a highly recommended text which will undoubtedly receive the same wide approval the previous editions have enjoyed — *KUFUS J. PLARSON Jr Col MC USA*

**PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON THE PEACEFUL USES OF ATOMIC ENERGY** Held in Geneva 8 August 20 August 1955. Volume 10. Radioactive Isotopes and Nuclear Radissions in Medicine. 544 pages illustrated. United Nations Publications, 1956. Distributed by Columbia University Press New York, N. Y. 1956. Price \$8.

This publication volume 10 of a 16-volume series records the proceedings of the International Conference on the Peaceful Uses of Atomic Energy held at Geneva Switzerland from 8 to 20 August 1955 under the auspices of the United Nations. Eighty-five original papers with minor editing are included as well as appropriate verbatim records of the conference. The papers by leading authorities of the various countries cover a wide range of subjects indicating experiences with accepted uses of isotopes as well as suggestions for future studies. The majority of papers are oriented toward direct human applications of diagnosis and treatment in the fields of endocrinology, metabolism, hematology, and cancer. Excellent papers are also presented in the general fields of biochemistry, nutrition, and public health including studies in mosquitoes and helminths. Other than for the few frankly review papers all material is heretofore unpublished data representing variations in methodology or adaptations of previously published principles.

One is impressed with the world wide impact of these relatively new techniques in the practice of medicine. With an increasing number of reactors available for isotope production throughout the world clinical specialists and biologists will have opportunities to use these materials as an aid to understanding their particular problems as well as those of general interest.

This entire series of books should be a valuable addition to medical libraries for both its historical and technical interest.

—*JAMES B. HARTGERING Lt Col MC USA*

**CHANGING CONCEPTS OF PSYCHOANALYTIC MEDICINE** Proceedings of the Decennial Celebration of the Columbia University Psychoanalytic Clinic March 19 and 20 1955 edited by Sandor Rado M.D. D. Pol. Sc. and George E. Daniels M.D. 248 pages Grune & Stratton Inc. New York N. Y. 1956. Price \$6.75.

The articles contained in this volume are based on papers presented at the Decennial Celebration of the Columbia University Psychoanalytic Clinic held in March 1955. The contributors are an erudite group most of whom are faculty members of the Clinic. The volume sets forth the outstanding accomplishments of this Clinic by infusing an atmosphere of free inquiry into psychoanalysis and by incorporating psychoanalytic techniques into graduate medical training in a unique atmosphere of training the selection of students.

curriculum are described. The contents of the book demonstrate the great indebtedness of the faculty to the energy and guidance of Dr Sandor Rado whose "adaptational psychodynamics" has been built upon the theories of Freud and realigned them in terms which are biologically oriented. A diagnostic survey is presented of the clinic's case load with the finding that 59.3 per cent of the applicants for treatment were diagnosed as having schizophrenia. The discussion of diagnostic criteria and the implications of this figure are of great interest.

Psychotherapy is usefully termed as reparative or reconstructive in nature and the application of these differing therapeutic approaches to clinical cases is described. On a clinical level the changing concepts of psychoanalysis are dramatically outlined in papers on a Family Study Unit and on interlocking pathology in family relationships. Such a broad inclusive approach is also evident in a paper by Kardiner examining adaptational theory from a cross cultural point of view and in Glueck's study of psychodynamic patterns in the sexual offender. Perhaps of greatest interest to the reader in showing the wide reorientation of this psychoanalytic group are the papers by Daniels on comprehensive medicine and by Gerard and Heath on brain physiology and multidisciplinary research in psychiatry.

This is an excellent volume well written and an excellent commentary on the best of present day thinking in psychiatric training, treatment and research. It will be of interest to all working in psychiatry especially if engaged in teaching and research. —JOHN C. MEBANE Maj USAF (MC)

**PSYCHOANALYSIS OF BEHAVIOR** Collected Papers by Sandor Rado M.D.  
D. P. Sc. 387 pages Grune & Stratton Inc. New York N. Y. 1956  
Price \$7.75

In this work Dr. Rado has assembled his personal writings during the period from 1922 to the present. The earliest papers were published in Vienna and London during the time when the author was director of the Berlin Psychoanalytic Clinic. These papers were written under the spell of Freud's influence and are essentially contributions to classical psychodynamics. Perhaps the most valuable of these is "The Psychoanalysis of Pharmacohymia (Drug Addiction)" published in 1933 but a model for those who deal with this problem today.

Dr. Rado has entitled the second portion of his collected papers "Quest for a Basic Conceptual Scheme." The papers in this section were developed after the author had emigrated to the United States and had begun to exert what has become an appreciable influence on the course of psychoanalysis and psychiatry in this country. He had by this time become dissatisfied with Freud's formulations and sought to re-construct them in a biologic frame of reference. Rado's paper "Scientific Aspects of Training in Psychoanalysis" (1938) signals his effort to present psychoanalysis as "an empirical clinical science not an authoritarian theoretical doctrine." Included in this section is "Pathodynamics and Treatment of Traumatic War Neurosis" (1942) in which the author sets forth a timely and accurate perspective to guide psychiatry during the challenging period of World War II.

In 1946, the author's explorations bore fruit in the development of "Adaptational Psychodynamics." Further contributions to graduate residency training in psychoanalytic medicine were made. "An Adaptational View of Sexual Behavior" and "Emergency Behavior," two of Dr. Rado's greatest contributions are elucidated in graphic style well supported by diagrammatic illustrations. In a discussion of "Recent Advances in Psychoanalytic Therapy" the author describes the adaptational technique and compares it with the chief therapeutic ideas evolved in the past. Future problems include the pressing social need for trouble shooting and easing methods of treatment. The physician's emotional needs and their impact upon treatment should also be explored. The author regards this as a neglected chapter of inquiry.

The "Dynamics and Classification of Disordered Behavior" (1953) presents the author's own psychiatric nomenclature. This unfortunately adds little but confusion to the newest standard nomenclature of the American Psychiatric Association which was introduced at about the same time. Although the terminology differs the underlying thinking appears very similar.

In summary, this is an excellent work for the student who wishes to study present-day trends of psychoanalytic thought. The writing style is lucid and the ideas expressed would be stimulating to anyone interested in human behavior. The book will be of especial value to psychiatrists and a "must" for those engaged in psychoanalytic therapy.

—JOHN C. MEEHAN, Maj, USAF (MC)

NEUROLOGICAL AND NEUROSURGICAL NURSING by C. G. de Gutierrez Mahoney, M.D. and Esta Carini, R.N., M.A. 2d edition. 565 pages illustrated. The C. V. Mosby Co., St. Louis, Mo., 1956. Price \$6.25.

The current edition of the "only textbook of its kind" deserves nothing but high praise for the authors who have most admirably achieved their purpose—that of meeting the need for effective nursing care in these specialties. A comprehensive covering of such a highly specialized field has long been needed for the nursing profession and with the inclusion of several new chapters in this edition the goal has been most effectively attained.

To provide an understanding of the signs and symptoms of neurologic disorders, an excellent presentation of neuroanatomy, physiology and the related scientific principles is given in the early part of the text. Diagnostic procedures are completely discussed and the importance of nurses' observations are emphasized throughout. The authors have successfully integrated physical, social and emotional factors of illness in planning nursing care as shown by their statement: "An understanding of the underlying mechanisms motivating human behavior is an essential requisite of the well qualified nurse."

This book is strongly recommended for both nurses. It is an excellent reference text for

head nurses and especially for those who give direct nursing care to all types of patients. This book is so written as to provide the professional nurse with a wealth of information related to total patient care.

—VERA E. THOMPSON, Lt. Comdr. NC, USN

**A Manual of the COMMON CONTAGIOUS DISEASES** by Philip Moen Stinson, M. D. and Horace Louis Hodges, M. D. 5th edition. 624 pages. 84 illustrations and 10 plates. 8 in color. 16 tables. Lea & Febiger Philadelphia, Pa. 1956. Price \$5.50.

This is an extensive volume which covers the field of common contagious diseases in a very thorough manner. The format of the book is excellent and the complete detail makes this a superb text which should be available to all teaching personnel or physicians treating the diseases.

The first three chapters are devoted to principles of contagion, serum reactions and the antibiotics and sulfonamides. These chapters provide an excellent refresher and ready reference for those who require it. There is a very complete summary of the common contagious diseases in table form covering all of the pertinent points for quick reference.

The black and white photomicrographs are clear, the black and white illustrations are quite good. The color plates are superior and the authors and the publisher are to be complimented on them.

The final chapter gives a good resume of the general management of contagious diseases which should be made available in hospitals that provide care in these diseases.

It appears that the authors intended this book to be used as a reference in teaching and in the care of common contagious diseases. Their efforts have produced a book which should be in the hands of all physicians engaged in public health, preventive medicine, pediatrics and teaching activities. —THEODORE C. BEDWELL, J. Col. USAF (MC)

**HANDBOOK OF PEDIATRIC MEDICAL EMERGENCIES** by Adolph G. De Sanctis, M. D. with the collaboration of Charles Laiga, M. D. and 10 contributors. 2d edition. 389 pages. 73 illustrations. The C. V. Mosby Co. St. Louis Mo. 1956. Price \$6.75.

The second edition of this handbook has been largely rewritten and has been expanded to include new chapters on metabolic emergencies, accident and poison prevention, genito-urinary emergencies and respiratory paralysis in poliomyelitis.

This is a compact, well written and immensely practical handbook for all physicians treating children. The sole purpose of this book is to outline sound therapeutic advice to guide the physician in handling emergency pediatric problems. It is not meant to be a complete text of pediatrics but a reliable guide for the physician facing a pediatric problem requiring rapid emergency therapy.

The authors have succeeded admirably in their purpose. For the earlier edition of this book has been enthusiastically received not only in

the United States but also in many foreign countries. The chapters are short and succinct and suggest readily available therapeutic agents of life saving importance in treating the emergencies described. The authors cover not only the common serious emergencies but also many less serious though still troublesome, emergencies such as insect bites, toothache, epistaxis, hiccough, frostbite and sunburn.

The text is well organized and is supplemented with a comprehensive and well organized index—a must for a book such as this. This book is highly recommended for any physician caring for children.

—THOMAS E. CONE, Jr. Col. MC USA

PROGRESS IN PSYCHOTHERAPY 1956, edited by *Frieda Fromm-Reichmann* M.D. and *J. L. Moreno* M.D. 352 pages Grune & Stratton Inc. New York N.Y. 1956. Price \$8.50

This volume is the publication in book form of the papers presented at the meeting of the American Psychiatric Association in Atlantic City 1955. To these there have been added brief surveys of the field of psychotherapy in Austria, Great Britain, France, Germany, South America and Switzerland.

One hundred and forty-two different techniques are mentioned in all from the psychodrama of Moreno and existential analysis to autogenic training and multiple therapy of Whitaker. More than forty psychotherapists from many parts of the world contributed to the volume. While the descriptions of some of the techniques are necessarily brief, yet the editors do succeed in giving the reader an easy opportunity to compare different philosophies and methods.

The book points out quite clearly that psychotherapy is not a science and that no technic can claim superior results. It suggests that the personality of the therapist may be the most important fact. Moreno states bluntly that "The personality of the therapist is the skill." The book is heartily recommended for residents in psychiatry in particular and to all those who wish to have a quick glance at the various types of psychotherapy.—JAY F. TUTTLE, Lt. Col. MC USA

THE YEAR BOOK OF PATHOLOGY AND CLINICAL PATHOLOGY (1955-1956 Year Book Series) edited by *William B. Wartman* M.D. 480 pages illustrated. The Year Book Publishers, Inc. Chicago Ill. 1956. Price \$6.50

This yearbook, similar to its predecessors, summarizes concisely the important literature of pathology for the year 1955. The format of the volume is essentially the same as in previous years; that is, the book is divided into two main sections: pathology and clinical pathology, with further subdivisions into the main categories of these disciplines. The introduction, stating how the volume is compiled, demonstrates the huge amount of literature covered.

The editor has again done a fine job in condensing a large amount of material and presenting it in a lucid, readable form with other references. Editorial comments throughout.



ticularly valuable indicating the significance of the article and relationships to both past and present work. The illustrations and graphs frequently add to the usefulness of the text. While there are occasional typographical errors they do not detract from the value of the book as the context is always clear. The book is invaluable as a ready reference and review of the literature. It is highly recommended to pathologists as well as to physicians in general. —HOWARD A. VAN AUKEN Col. MC USA

**THE ACCIDENT SYNDROME** The Genesis of Accidental Injury A Clinical Approach by Morris S. Schulz M. A. M. D. 234 pages illustrated Charles C Thomas Publisher Springfield Ill. 1956. Price \$6.50

This book is based on data collected from 35,000 consecutive accident cases seen by the author over a period of 20 years. Because of his interest in the circumstances surrounding each accident and in the patient's emotions and past history, his data is unusually illuminating.

Throughout the book the importance of more medical interest in accident prevention is stressed and the arguments are very convincing. The major findings and conclusions are contained in the second chapter. This departure from more orthodox organization is not objectionable and serves to develop more reader interest. The third chapter deals with concepts of accident causation and proves to be an excellent presentation of previous work on the emotional aspects of accident causation.

The author's data confirms many previously formulated ideas on accident-causation presenting the concept of the accident syndrome. He indicates the possibility of predicting with reasonable certainty when, to whom and under what circumstances an accident is most likely to occur. The widely accepted theory which attributes most accidents to a small, fixed group of accident-prone individuals is challenged by the author's data which indicates that this small group of accident-prone individuals is constantly changing.

This book should be of value to physicians in general but particularly to those treating accident cases and to the psychiatrist.

—JAMES J. GIBBS Maj. MC USA

**INFANT METABOLISM** Proceedings of the World Health Organization Seminars Held at Leyden and Stockholm in October-November 1950 conducted by E. S. Gorter, S. Z. Levine and A. D. Wallgren. Edited by Herbert Scheberg. 435 pages illustrated. The Macmillan Co. New York N. Y. 1956.

The purpose of these seminars was to bring together a group of leading medical investigators with special interest in the broad fields of infant metabolism so that scientific information might be exchanged on a research level among countries where such studies were currently in progress. Nine countries and 21 universities were represented. In broad terms, the theme of the two seminars was similar and embraced current physiological, biochemical, nutritional and clinical problems in infant metabolism. The topics reviewed in individual panels are presented as separate chapters in the volume.

The panel on water and electrolyte metabolism dealt mainly with the role of sodium and potassium. The role of the steroids and other hormones in water balance was only briefly discussed while the panel on metabolism in premature infants was very interesting. The studies on fat metabolism lead to contradictory results as authorities from various countries could not substantiate each other.

The discussions of metal, vitamin and protein metabolism are mainly concerned with experimental information and have little value to the practicing pediatrician. Variable basal metabolic rates were obtained in children under four years of age and it was concluded that there is still little that is known of basal metabolism in infants.

This publication is not for the general practicing pediatrician but is a valuable reference book for one interested in research in metabolism. It has little or no bibliography and is of little value as a source book.

— WILLIAM I. NEMURA, *Corvallis, OR, USA*

**COLLECTED PAPERS OF THE MAYO CLINIC AND THE MAYO FOUNDATION**, edited by *Richard M. Heintz M. A. M. D.*, *John R. Miner Sc. D.*, *James R. Eckman M. A. Ph. D.*, *Katharine Smith B. A.*, *Carl W. Gambill M. D. M. P. II.*, *Florence Schmidt B. S. E.*, and *George G. Stillell M. D.* Volume XLVII 1955. 791 pages illustrated. W. B. Saunders Co. Philadelphia Pa. 1956.

This volume is a compilation of the publications from the Mayo Clinic and the Mayo Foundation from 1 December 1954 through 30 November 1955. It is comprised of 137 articles presented in full, in abridged form or in abstract that were selected from a total of 734 papers. Bibliographies of the unpublished papers appear at the end of appropriate sections. The editorial staff has selected for inclusion an outstanding group of papers. Some deal with the present activities in the Mayo Clinic describing recent efforts and advances. This is particularly true of the first section devoted to "Surgery of the Heart and Blood Vessels with Special Reference to the Extracorporeal Bypass Pump Oxygenator." Other papers reflect the vast experience of the Clinic in selected disease states. The photographs, charts, drawings, and graphs liberally used by some of the authors are excellent in their conception and clear in reproduction.

The papers represented and those listed by title only are divided into 13 main groups. Those recorded by title only are presented alphabetically by author, together with the subject and the medium wherein it is published. A complete listing is repeated at the end of the book. The subject index at the end of the book covers the contents of the published papers but unfortunately does not cover the papers listed by title only.

This annual presentation of the accomplishments of the Mayo Clinic and Foundation is of great value to all physicians in their special interests. It is a must for medical libraries.

—PA

**CYTOLOGY OF THE BLOOD AND BLOOD-FORMING ORGANS** by Marcel Bessis M. D. Translated by Eric Ponder M. D. 629 pages 427 illustrations including 22 full-color plates Grune & Stratton Inc. New York N. Y. 1956. Price \$22

Workers in the field of hematology will appreciate Marcel Bessis' book which deals principally with the study of blood cells in their living state and of their ultrastructure utilizing the latest methods and techniques including electron and phase microscopy. It brings together much reliable information about recent advances in hematologic techniques. The contents cover 15 chapters divided into three parts.

This book is up-to-date and the coverage of the literature is adequate as each chapter has an excellent bibliography which is truly international in character. It is printed on good paper with large readable type. The text is profusely illustrated with color plates and many remarkable photomicrographs of living cells made with phase microscopic techniques as well as those of fixed blood cells made with electron microscopic techniques.

This reviewer was very favorably impressed by the readability of the book and with its clarity and elegance—an accomplishment in a large measure attributable to the excellent translation by Dr. Ponder. Here available in English is a volume that should be widely read especially by those seeking information and orientation in the rapidly developing field of hematology. It can be recommended for reading or reference to the clinical pathologist and the internist as well.

—CHARLES J. FARINACCI Col. MC USA

**A NEW PSYCHOTHERAPY IN SCHIZOPHRENIA** Relief of Frustration by Symbolic Realization by Marguerite Sechebaye translated by Gaele Rubin-Rabson, Ph. D. 199 pages Grune & Stratton Inc. New York N. Y. 1956 Price \$4.50

The treatment of schizophrenia by psychological means is always an interesting subject and in recent years a number of books have been written using various approaches each attempting to point the way.

This book is a translation of a series of lectures given to the medical staff of the Burgholzli Psychiatric Clinic in Switzerland by Mme Sechebaye. Her method is called symbolic realization and is described as a therapy aimed directly at the needs and frustrations endured in childhood to fulfill and satisfy them on the presymbolic magic and concrete level. In formulating the method of therapy she draws heavily upon psychoanalytic and existentialist concepts as well as on genetic psychology. However the necessity of using ordinary psychiatric techniques such as an adequate history and questioning of relatives is emphasized. The constitutional factor is not underestimated and in certain cases strictly organic therapy may be employed to facilitate contact with the patient.

Schizophrenic symptoms are carefully analyzed and are divided into four categories: first those manifestations directly expressing the

January 1957)

## RESULTS OF TREATMENT

187

psychotic experiences second the experience of frustration such as aggression guilt and anxiety the third the experience of positive reactions to frustration in some cases as seen typically in paranoia and fourth the experience of the needs themselves in symbolic form.

Divining and as testing the needs in the appropriate fashion is the task of the therapist. This may even take the form of assisting patient to play the part of an infant — to take satisfaction from other satisfactions of early life etc. in fact or symbolically depending on the level of its current state. See above discussion of various problems involved and also heavily on the case of Florence a schizophrenic whom the method successfully treated. She does not claim her method is a panacea for schizophrenia and even so the difficulties involved. The book is provocative and stimulating but not easy reading. It should be of interest to any psychiatrist treating psychotic patients — JACQUES TIGHE, M.D.

ORAL CANCER AND TUMORS OF THE JAW by George A. H. Weldon & Bullock M.D. M.C. (Hartford) & John E. Lippert M.D. 360 pages illustrated. The Blakiston Division, Philadelphia, Pa. Inc. New York, N.Y. 1956. Price \$15.

This is the first edition of a book concerned with the clinical diagnosis of oral cancer and collaborated on by a surgeon a pathologist and a specialist in oral cancer diagnosis. In the author's preface this is not a textbook but a syllabus for the oral diagnosis course.

The basic organization of the material is good and the inclusion of chapters on the history of cancer the origin of cancer classifications of oral neoplasms, a discussion of biopsy procedure and a brief discussion of precancerous lesions will be an aid and a review to the clinician.

The text is generally well written, however a few statements are made and terms used which are debatable or open to question. The small paragraph devoted to the so-called retinal anlage tumor leaves the reader with the impression that the retinal origin is relatively well established. This tumor is considered by some pathologists as odontogenic in origin. The inclusion of the term "odontogenic" is unfortunate since the use of "odontogenic" is acceptable and well established in the literature. The discussion of the pathogenesis of ameloblastoma with emphasis upon the basal-cell theory of origin might be questioned by many oral pathologists, especially in the United States.

The great value of the volume lies in the multitude of excellent illustrations. Especially worthy of note is the high degree of technical proficiency used in the preparation of the roentgenograms for routine. This book will be of value to all practicing dentists especially periodontists and oral surgeons. Physicians who are concerned in their practice with the diagnosis and treatment of oral lesions, especially neoplasms will also find this book useful. — WILLIAM SPRAGUE, CHS, USA (DC)

**CYTOLOGY OF THE BLOOD AND BLOOD-FORMING ORGANS** by *Marcel Bessis* M D Translated by *Eric Ponder* M D 629 pages 427 illustrations including 22 full-color plates Grune & Stratton Inc New York N Y 1956 Price \$22

Workers in the field of hematology will appreciate Marcel Bessis' book which deals principally with the study of blood cells in their living state and of their ultrastructure utilizing the latest methods and techniques including electron and phase microscopy. It brings together much reliable information about recent advances in hematologic techniques. The contents cover 15 chapters divided into three parts.

This book is up-to-date and the coverage of the literature is adequate as each chapter has an excellent bibliography which is truly international in character. It is printed on good paper with large readable type. The text is profusely illustrated with color plates and many remarkable photomicrographs of living cells made with phase microscopic techniques as well as those of fixed blood cells made with electron microscopic techniques.

This reviewer was very favorably impressed by the readability of the book and with its clarity and elegance—an accomplishment in a large measure attributable to the excellent translation by Dr. Ponder. Here available in English is a volume that should be widely read especially by those seeking information and orientation in the rapidly developing field of hematology. It can be recommended for reading or reference to the clinical pathologist and the internist as well.

—CHARLES J. FARINACCI Col. MC USA

**A NEW PSYCHOTHERAPY IN SCHIZOPHRENIA** *Relief of Frustrations by Symbolic Realization* by *Maguerite Sechebaye* translated by *Gace Rubin Rabson* Ph D 199 pages Grune & Stratton Inc New York N Y 1956 Price \$4.50

The treatment of schizophrenia by psychological means is always an interesting subject and in recent years a number of books have been written using various approaches each attempting to point the way.

This book is a translation of a series of lectures given to the medical staff of the Burgholzli Psychiatric Clinic in Switzerland by Mme. Sechebaye. Her method is called "symbolic realization" and is described as a therapy aimed directly at the needs and frustrations endured in childhood to fulfill and satisfy them on the presymbolic and concrete level. In formulating the method of therapy draws heavily upon psychoanalytic and existentialist concepts as well as on genetic psychology. However the necessity of using psychiatric techniques such as an adequate history and physical relatives is emphasized. The constitutional factor is not and in certain cases strictly organic therapy may be facilitated contact with the patient.

Schizophrenic symptoms are carefully analyzed and four categories first those manifestations directly

Undoubtedly, the people engaged in the search for truth by Dr. Burch exist and, by the same token, the people engaged in the search for truth by other individuals who do not agree with Dr. Burch. The unknown will derive keen and quiet enjoyment from a perusal of this book which is clearly illustrated in a very interesting and severely critical manner.

DIAGNOSIS AND TREATMENT OF VASCULAR DISEASES, 1922, edited by Saul S. Sarnoff, A. M., M. D., with 100 illustrations, illustrated. The Williams & Williams Co., Baltimore, Md. 1922. \$6.

The editor of this volume has called upon the extensive knowledge and experience of 17 contributors who have a masterful grasp of the subjects. Each is a nationally known authority in his specialty, these range from anatomy, physiology, internal medicine, and surgery to physical medicine.

With the exception of the chapter on the anatomy of the peripheral circulation which necessarily is brief, all of the subjects are covered in a very comprehensive manner. Of especial interest to the diagnostician is the section on examination of the patient which includes not only the various ramifications of the history and physical examination, but the invaluable laboratory methods of interpretation. Prominent among these is the discussion on plethysmography. In addition to the conditions treated primarily by medical methods, the present emphasis in the surgical management of aneurysms is clear, acute arterial thrombosis and aortic lesions are adequately presented. In addition the chapter on anticoagulant therapy is also included.

Each chapter has an extensive bibliography for the reader who wishes to further investigate vascular disorders, and the text abounds with excellent illustrative charts and photographs. A prime example of this is the chapter on angiography.

It is believed that this book could profitably be read by all internists and surgeons who may be confronted with vascular problems. It would also make an authoritative addition to the library of those particularly interested in the entire subject of angiology which includes both medical and surgical components of vascular disorders.

— 10410 } 141012 } 1000 1000 1000

TEXTBOOK OF UPOLOGY By Victor F. Marshall M.D. (4 pages illustrated)  
Paul B. Hoeber, Inc., Medical Book Dept. of Harper & Bros., New York,  
N.Y. 1956 Price \$5.50

This book was developed from 20 formal lectures given to third year medical students by various lecturers and revised by the author. It is relatively small in size when compared with most of such texts. A short history of urology is given in a clear and concise manner which includes an excellent summary of the various methods, including laboratory tests, to be employed in the performance of urologic investigation. Each of the chapters contains simple, succinct, yet complete sections on the

**CLINICAL SELECTIONS IN DERMATOLOGY AND MYCOLOGY** by *Federick Rehm Schmidt* M D with contributions by 36 specialists from various lands 505 pages Charles C Thomas Publisher Springfield Ill 1956 Price \$10 50

As its title implies this book is made up of selected readings on many varied subjects in the fields of dermatology and mycology Dr Schmidt the author of 14 chapters has edited the other 29 chapters contributed by 36 specialists mostly physicians and scientists of the various American countries Many of the chapters are excellent having been written by authorities on the particular disease or subject under discussion Their writings reflect excellent first hand observations and concise reporting A few chapters however are too superficial and brief in the handling of the subject matter and therefore of limited value

The relationship of climate personal hygiene environment and diet in the diseases considered is frequently discussed Much can be learned from this book about dermatologic conditions or diseases with dermatologic manifestations which are uncommon in the United States Treatment of the diseases where applicable is discussed in a logical and concise manner using whenever possible drugs which are universally available A number of controversial opinions and original ideas are expressed and these will prove stimulating and thought provoking for the seasoned dermatologic reader

This book is well written and well edited and covers many subjects in an interesting and informative manner It should be read by all dermatologists and by other physicians interested in one or more of the discussed diseases and belongs in all medical reference libraries

—JOHN W ALBRITAIN Capt MC USN

**OF RESEARCH PEOPLE** by *George E Burch* M D F A C P 56 pages illustrated Grun & Stratton Inc New York N Y 1955 Price \$3

This is a short book of 56 pages The cryptic duties of the galaxy of "research people" from the responsible investigator to the dish washers are presented in terse description and pointed caricature

Dr Burch describes the true investigator as one with the ability make discoveries and differentiates between the scientists who discover and the individuals who provide a new or different application or development His contention that discoveries are made by man development by many will be accepted by the searchers However his opinion that the best research is in the laboratory by an able investigator either alone or in the presence of not more than one or two competent technicians quality of research tends to vary inversely with the number of assistants will be seriously questioned by many investigators instances where team work by several individuals in different scientific disciplines were able to obtain the solution that would have remained unsolved by the effort of a single investigator

**SELECTED PAPERS ON PSYCHO-ANALYSIS** Volume I On the Early Development of Mind, by *Edward Glover* M. D. 493 pages International Universities Press Inc., New York, N. Y. 1956 Price \$7.50

In his inimitable literary style, which has both clarity and picturesque imagery Dr. Glover presents in this collection of selected papers on psychoanalysis a very worthwhile study of the early development of the mental and emotional processes of the human individual. While the book requires a basic understanding of psychoanalytic principles and concepts it serves to unite many of these concepts and principles into a more usable form. Particularly impressive are the scientific standards which Dr. Glover requires of himself and others in presenting various aspects of the science of psychoanalysis. Of particular interest are his papers on the psychology of the psychotherapist, the application of psychoanalytic principles in psychiatry, research methods in psychoanalysis and the indications for and frontiers of, psychoanalysis. All of these papers emphasize the advances important in the future of psychoanalysis in scientific medicine.

While this volume is of most value to serious workers in psychoanalysis whether student or analyst it will provide many other professional students of human behavior with both scientific information and a literary masterpiece.

This is an excellent companion to Dr. Glover's book *The Techniques of Psychoanalysis*. Both books should be in the working library of professional workers in psychoanalysis. —*LEON GATTO* Col. USAF (MC)

**THE NEUROSURGICAL ALLEVIATION OF PARKINSONISM** by *Irving S. Cooper* M. D. Ph. D. 104 pages illustrated Charles C. Thomas Publisher Springfield Ill. 1956 Price \$8.50

This monograph clearly and concisely presents the author's technique for the alleviation of the most severe symptoms of parkinsonism by occlusion of the anterior choroidal artery and chemopallidectomy. He first reviews the problem of severe parkinsonism and the efficacy of the medical and previous surgical approaches to remedy the main symptoms of this disease. The anatomy, functions and blood supply of the globus pallidus and its role in the parkinsonian complex are described. There is a complete review of the author's operations for occlusion of the anterior choroidal artery and chemopallidectomy including the selection of suitable cases for each procedure, anesthesia, the importance of pre- and post-operative arteriograms, postoperative care and the operative mortality.

Case reports of 15 patients with anterior choroidal artery occlusions and 10 patients with chemopallidectomy are presented and include many pre- and post-operative photographs. The text is also well treated with excellent sketches of the operative technique.

This text is primarily intended for neurologists but will also find the case histories



The author should be commended for this excellent presentation of his operative material and it is hoped that his record of 70 per cent improvement in these cases will be of a lasting nature.

—WILLIAM J. JAMES Capt MC USA

**BIOCHEMICAL MECHANISMS IN INFLAMMATION** by Vally Menten M. A. M. D. 2d edition completely revised Edited by Edward J. Ryan, D. D. S. 438 pages illustrated Charles C. Thomas Publisher Springfield Ill. 1956. Price \$9.50

The second edition of this monograph on biochemical mechanisms in inflammation has been expanded and now includes observations by many investigators as well as the author. The material is presented in an integrated manner and the reader is introduced to recent facts and theories of inflammation. The author has long maintained that in inflammation the altered biochemistry of the injured cell causes the liberation of biochemical units. This theory is reviewed and examined in the light of additional data obtained by the author. New material has been added regarding the pyrogenic factor, the anti-inflammatory corticoids and ACTH.

This book is of interest to those who wish to probe into the biochemical mechanisms of the injured cell in inflammation.

—ELSON B. HELWIG Col MC USA

**COMPLETE MOUTH REHABILITATION THROUGH CROWN AND BRIDGE PROSTHODONTICS** by Harry Lazar D. M. D. and Albert J. Lazar D. M. D. 392 pages 551 illustrations on 332 engravings Lea & Febiger Philadelphia Pa. 1956. Price \$15

The text of this book which is prepared in three parts is a guide to full mouth rehabilitation through crown and bridge prosthodontics. The first part sets forth fundamental principles, theories and functional aspects of rehabilitation. Chapters on anatomy of the temporomandibular joint, physiology of mastication, physiologic rest position, vertical dimension, occlusion and periodontal considerations are capably presented. The second reports 25 cases involving typical mutilated dentition problems encountered in practice. The methods and techniques employed by the authors for diagnosis, planning and treatment are discussed in each case. The third part opens with a discussion of anesthesiology in relation to crown and bridge prosthodontics while following chapters present operative and technical factors in considerable detail. The text is concluded with a pictorial description of a technique for construction of movable removable precision attachment partial dentures.

Excellent organization of the text and a concise manner of presentation lend themselves to easy reference and reading while well selected illustrations augment and clarify the text.

—ARTHUR R. FRECHETTE Capt DC USA

**BASIC READINGS ON THE MMPI IN PSYCHOLOGY AND MEDICINE** edited by George Schlager Welsh and E. Grant Dahlstrom. 336 pages. University of Minnesota Press, Minneapolis, Minn., 1956. Price \$8.75

The Minnesota Multiphasic Personality Inventory (MMPI) is a multi-variate personality instrument which is currently one of the most widely used questionnaires and one of the best empirically constructed scales. Ever since its introduction 15 years ago a tremendous amount of effort has been expended in constructing and attempting validation not only of the original MMPI scales but also of some 100 additional scales. The editors of this collection of articles, a psychologist and psychiatrist, both members of the departments of psychology and psychiatry, have rendered a good service to students of human behavior, amateur or professional, by bringing together in book form these basic readings on the MMPI in psychology and medicine.

Of the 699 articles on the MMPI arranged in a master list in the bibliography and complete through December 1954, the editors chose 10 per cent (66 articles by 43 authors) of those they considered to be the most important as the basis of this book. Selections were difficult to make and compromise was necessary to pick articles that would be most serviceable to psychologists and psychiatrists as well as to clinicians, research workers, and students of personality test construction and theory. Preference was given to publications having historical priority, completeness of analysis, sample representativeness, or imaginative design. Over half of the 699 MMPI items have appeared in the years since 1950. The articles chosen range over the years from 1940 through 1954 and include three original papers prepared especially for this book.

The book presents evidence of the urgent need, when using the MMPI and other diagnostic tools, for obtaining necessary validating estimates required in personality measurement. In clinical practice we find that the MMPI scale scores indicate possible areas of maladjustment by sorting profiles according to their highest abnormal T scale scores. Users of the MMPI or its 100 other scales will find this book indispensable. —FRANK ALLMAN, Jr., Lt Col USAF (MSC)

**TREATMENT OF HEART DISEASE: A Clinical Physiologic Approach** by Harry Gross, M.D. and Abraham Jeger, M.D. 549 pages, illustrated. W. B. Saunders Co., Philadelphia, Pa., 1956.

This book is different and it has a valuable place among textbooks for specialists in internal medicine and cardiology. The overall approach is one of adapting basic information very clearly and practically to effective treatment of patients with heart disorders either in office or within the hospital. The book includes discussions of practice, basic mechanisms of cardiac symptoms and management, hypertensive, inflammatory, and congenital heart disease problems, surgery in the cardiac patient, and diseases of the heart secondary to metabolic disorders. The concluding part deals realistically with the emotional problems of the patient with heart disease and his general life in his community.

This entirely new text was written primarily for practitioners of medicine but it includes a great deal of basic information of value to students as well as graduates in medicine. The viewpoints of other authorities and their interpretations are presented.

The double column format of this book makes it easy to read. For the student in cardiology who desires further details each chapter closes with a long list of references. This is not just another book but a really worthwhile contribution.

—U R MERIAANGAS Col MC USA

BRITISH MEDICAL BULLETIN Volume 12 Number 1 January 1956 Recent Research on Vitamins 90 pages illustrated Published by the Medical Dept The British Council London W1 England Distributed by Oxford University Press New York N Y Jan 1956 Price \$2.75

The January 1956 issue of the authoritative *British Medical Bulletin* is devoted to advances in vitamin research. Some of the most prominent names in British medicine are present and in keeping with their traditions the articles are short, clear, and pertinent. The subject matter includes the role of vitamins in vision, bones, skin, and nervous system as well as such topics as the effects of food processing, antivitamin, and lipotropic agents. These articles serve as an excellent current survey and as a helpful reminder that much remains to be done in the field of vitamin nutrition. —S O WAIFE Lt Comdr MC USNR

AN ATLAS OF ANATOMY by J. C. Boileau Gant M C M B Ch B F R C S (Edin.) 4th edition 8½ by 11 inches in size 556 pages 714 figures in color arranged in the regional manner The Williams & Wilkins Co Baltimore Md 1956 Price \$15

This atlas has earned a secure place among basic anatomy volumes and the improvements added to this edition further enhance its value and function.

Many of the old illustrations have been improved, some enlarged, and some deleted, and there are 80 new figures. The new additions include cross sections of the limbs and neck, orbital and nasal cavities, basic diagrams of the arteries of the upper and lower limbs, and many others. Other basic diagrams clearly depict the scheme of motor distribution of the limbs, anatomic variants of the cystic duct and cystic and hepatic arteries, and variations in the pattern of the cutaneous nerves to the dorsum of the hand.

The format is simple and functional, and the index refers to figure numbers instead of pages, which directs one easily to the subject matter. The legends and footnotes include all practical facts.

This book is a one volume atlas and as such has adapted and condensed the illustrations to adequately and concisely cover the entire field. It is not presented as a surgical anatomy. Within these limitations this presentation has achieved its purpose and should retain a high listing among such books. —RALPH M. MUGRAGE Capt MC USN



## Monthly Message

An Arabic translation of the Hippocratic Oath by Ibn al-Usaybin, who died in 1269 is presented in its English equivalent.

## THE TEXT OF THE COVENANT LAID DOWN BY HIPPOCRATES

Hippocrates said I swear in the name of God the Master of life and death the Giver of Health and Creator of healing and of every treatment and I swear in the name of Aesculapius and of all the holy ones of God male and female and I call them to witness that I will fulfill this oath and conditions I will regard my teacher in this art as my father I will share with him my means of livelihood and I will make him my partner in my wealth and I will give him my wealth whenever he may be in need of it

As for his descendants I regard them as my brothers and I will teach them this art without any remuneration or condition should they desire to learn it And I associate together (i e regard as equal) in the injunctions and in the sciences and in all else contained in the art my own children the children of my teacher and the disciples on whom the oath (or covenant) has been imposed and who have sworn to observe the medical code of honour And I will not do so for any other than these

In all my treatment I will strive so far as lies in my power for the benefit of the patients And I will restrain myself from things which are injurious to them or unlikely in my opinion to do them harm And I will not give the poisonous drug or ask for it nor will I advise them thus to contemplate suffering any pessar which may cause in my contemplation the practice of my art I will in all my operations be well ware and will not operate on those who have ill health or a diseased bladde unless I have leave it for those whose profusion of blood I may go only of the blood which I may go only do a st of (all deliberate do misc such as might be or in sexual relation be or sla

And treating engaged couples as a whole, the results suggest that the more the couples are involved in the relationship, the more they are likely to be satisfied with the relationship. This is true for both men and women, and for both those who are currently engaged and those who have been engaged in the past.

He who fulfills this oath and does not violate any part of it to him will it be granted to carry out his treatment and his rest under the most excellent and favourable conditions, and to be praised by all men in future for ever, while the contrary will be the portion of him who transgresses it

*Frank B Berry*

FRANK B BERRY, M D  
Assistant Secretary of Defense  
(Health and Medical)

## Table of Contents

Sarcoidosis Treatment With ACTH and Cortisone— <i>John Q Thompson</i>	157
Myocardial Infarction in a Military Population— <i>Philip G Keil and Leon V McVay Jr</i>	166
Preserved Erythrocytes in Rh Antibody Testing— <i>Frank W Chorpemning Allen A Young and Raymond W Boudreau</i>	173
Differentiating Bacterial From Viral Pharyngitis and Tonsillitis A Rapid (Presumptive) Method— <i>Monroe H Green</i>	180
Developments in Social Psychiatry: Observations in Five Selected English Hospitals— <i>Dennie L Briggs and Lina Stearns</i>	181
Operative Results in Lumbar "Disk" Syndrome Majority of Patients Return to Full Duty— <i>Gale G Clark</i>	195
Oral Lichen Planus and Leukoplakia Differential Diagnosis and Treatment— <i>Harry L Levin</i>	198
Cutting Characteristics of Dental Burs As Shown by High-Speed Photomicrography— <i>Jock L Hartley Donald C Hudson William T Sweeney and Warren P Richardson</i>	209
Surgical Treatment of Plantar Corns— <i>Ben A Ruledge and Alvin L Green</i>	219
CLINICOPATHOLOGIC CONFERENCE	
3415th U S Air Force Hospital Lowry Air Force Base Denver Colo	222
SERVICE ARTICLES	
Progress in Aeromedical Evacuation— <i>L Render Broswell</i>	235
Psychotics Who Commit Offenses Punishable by Court Martial Recommendations for Their Early Diagnosis and Treatment— <i>Robert L Nelson</i>	243
Some Notes on the Historical Development of the Medical Service Corps— <i>James P Cooney</i>	254

# Monthly Message

An Arabic translation of the Hippocratic Oath by Ibn abi Usaybia who died in 1269 is presented in its English equivalent

## THE TEXT OF THE COVENANT LAID DOWN BY HIPPOCRATES

Hippocrates said I swear in the name of God the Master of life and death the Giver of Health and Creator of healing and of every treatment and I swear in the name of Aesculapius and of all the holy ones of God male and female and I call them to witness that I will fulfill this oath and conditions I will regard my teacher in this art as my father I will share with him my means of livelihood and I will make him my partner in my wealth and I will give him my wealth whenever he may be in need of it

As for his descendants I regard them as my brothers and I will teach them this art without any remuneration or condition should they desire to learn it And I associate together (I regard as equal) in the injunctions and in the sciences and in all else contained in the art my own children the children of my teacher and the disciples on whom the oath (or covenant) has been imposed and who have sworn to observe the medical code of honour And I will not do so for any other than these

In all my treatment I will strive so far as lies in my power for the benefit of the patients And I will restrain myself from things which are injurious to them or are likely in my opinion to do them harm And I will not give them any poisonous drug if they ask for it nor will I advise them thus Nor will I contemplate administering any pessary which may cause abortion And in my treatment and in the practice of my art I will keep myself pure and holy And I will not operate on those who have stone in the bladder rather I will leave it for those whose profession it is And I will enter every abode into which I may go only for the benefit of the sick being in a state devoid of (all deliberate intention of) wrong doing injustice mischief making such as might be intended in other transactions or in respect of sexual relations with woman or man whether free or slaves

And as for the things which I may see or hear during the time of treating the sick or at times other than those in which I am so engaged about such behavior of men as should not be talked of outside I will keep silence considering that such things should not be discussed

He who fulfills this oath and does not violate any part of it, to him will it be granted to carry out his treatment and his art under the most excellent and favourable conditions, and to be praised by all men in future for ever, while the contrary will be the portion of him who transgresses it

*Frank B Berry*

FRANK B BERRY M D  
Assistant Secretary of Defense  
(Health and Medical)

## Table of Contents

Sarcoidosis Treatment With ACTH and Cortizone— <i>John Q Thompson</i>	157
Myocardial Infarction in a Military Population— <i>Philip G Keil and Leon V McVay Jr</i>	166
Preserved Erythrocytes in Rh Antibody Testing— <i>Frank W Chaperning Allen A Young and Raymond W Boudreau</i>	173
Differentiating Bacterial From Viral Pharyngitis and Tonsillitis A Rapid (Presumptive) Method— <i>Monroe H Green</i>	180
Developments in Social Psychiatry Observations in Five Selected English Hospitals— <i>Dennise L Briggs and Lina Stearns</i>	184
Operative Results in Lumbar "Disk" Syndrome Majority of Patients Return to Full Duty— <i>Gale G Clark</i>	195
Oral Lichen Planus and Leukoplakia Differential Diagnosis and Treatment— <i>Harry L Levin</i>	198
Cutting Characteristics of Dental Burs As Shown by High-Speed Photomicrography— <i>Jack L Hartley Donald C Hudson William T Sweeney and Warren F Richardson</i>	209
Surgical Treatment of Plantar Corns— <i>Ben A Rutledge and Alvin L Green</i>	219

### CLINICOPATHOLOGIC CONFERENCE

3415th U S Air Force Hospital Lowry Air Force Base Denver Colo	222
--	-----

### SERVICE ARTICLES

Progress in Aeromedical Evacuation— <i>L. Render Braswell</i>	
Psychotics Who Commit Offenses Punishable by Court-Martial: Recommendations for Their Early Diagnosis and Treatment— <i>Roberts L Nelson</i>	
Some Notes on the Historical Development of the Medical Service Corps— <i>James P Cooney</i>	



## CASE REPORTS

Otol Surgery Complications Caused by Flight— <i>Lucian Smyd</i> .....	264
Prionism of Unknown Cause— <i>Edward C. Lewis II and Benjamin E. Schwarcz</i> .....	271
Spontaneous Rupture of the Stomach in Infants— <i>Marcus B. Moore Sr</i> .....	275
Kartagener's Syndrome— <i>Richard Foulk</i> .....	279

## DEPARTMENTS

A Message From the A. M. A .....	285
Deaths.....	287
The World Wide Rounds of the Air Force Physician.....	288
New Air Force Hospital in Libya.....	289
Officers Certified by Specialty Boards.....	291
Military Medical Dental Symposium.....	293
Medical Officer Elected President of Board of Psychiatry and Neurology.....	294

## BOOKS

Reviews of Recent Books.....	295
New Books Received.....	311

---

## Foreword

The *United States Armed Forces Medical Journal* is the medium for disseminating information of administrative and professional interest to all medical personnel of the Department of Defense. The Assistant Secretary of Defense (Health and Medical) and the Surgeons General of the several services invite all medical officers, dental officers, Medical Service Corps officers, Nurse Corps officers, and officers of the Veterinary Corps of the Armed Forces, and the medical consultants of the Army, Navy, and Air Force to submit manuscripts for publication in this *Journal*.

FRANK B. BERRY, M.D.  
*Assistant Secretary of Defense (Health and Medical)*

MAJOR GENERAL SILAS B. HAYS  
*Surgeon General, United States Army*

REAR ADMIRAL BARTHOLOMEW W. HOGAN  
*Surgeon General, United States Navy*

MAJOR GENERAL DAN C. OGLE  
*Surgeon General, United States Air Force*

# UNITED STATES ARMED FORCES MEDICAL JOURNAL

Volume VIII

February 1957

Number 2

## SARCOIDOSIS

Treatment With ACTH and Cortisone

JOHN Q THOMPSON, Major MC USA

**A**LTHOUGH various medications have been employed, there is no known satisfactory treatment for sarcoidosis. Contraversial results have been reported from the use of corticotropin (ACTH) and cortisone. In 1950, Thorn and his co workers<sup>1</sup> mentioned that a patient with sarcoidosis did not improve with ACTH therapy. Their findings prompted Sones and associates<sup>2</sup> to publish a preliminary report proclaiming the favorable response of patients with sarcoidosis to ACTH. Subsequently, several reports on the treatment of sarcoidosis with the steroid hormones have appeared in the literature, and the majority of these publications indicate that these drugs exert a favorable effect on the course of the disease.<sup>3-12</sup>

By reporting 11 additional cases of sarcoidosis treated with ACTH and/or cortisone, we hope to aid in the evolutionary evaluation of an obscure disease treated with little understood compounds. The 11 cases represent a range in manifestations from apparent pulmonary disorders with no subjective symptoms to incapacitating symptoms of various types.

### CLINICAL INVESTIGATION

The study concerned patients with sarcoidosis who were admitted to this hospital during the period 1952 to 1954. Only those patients who showed no improvement, or who showed an increase in sarcoid manifestations while on a regimen of bed rest, were chosen for steroid hormone therapy. (These patients remained on bed rest while undergoing diagnostic studies.) In each instance,

From U S Army Hospital, Camp Pickett Va. Dr Thompson is now with  
ment of Internal Medicine of the Scott and White Clinic Temple Tex

a complete case history and physical examination were recorded. Any suggestion of tuberculosis, diabetes mellitus, cardiovascular renal disease, or neuropsychiatric abnormality which might contraindicate the use of the steroid hormones was noted. Routine clinical investigation included a complete hematologic examination plus determinations for chemical constituents as serum proteins (with albumin globulin ratio), blood urea, blood glucose (fasting) and serum calcium. Urinalysis and roentgenogram of the chest and a biopsy of all organs suspected of having sarcoid involvement. When indicated, bone marrow and cerebrospinal fluid examinations and specific tests for liver and renal function were done. For most patients an ophthalmoscopic examination was performed by a qualified ophthalmologist.

Table 1 gives brief historical and diagnostic data for the series of 11 male patients. Nine patients were Negroes and two were white. Ages ranged from 21 to 35 years. Although one patient (case 8) denied any symptoms, subjective symptoms varied with organ involvement. All patients had some pulmonary manifestations (mediastinal lymph nodes, parenchymal involvement or both) but predominant chest complaints were recorded in only three instances.

The final diagnosis was based upon the clinical picture, characteristic roentgen appearance of the lungs, hyperglobulinemia, and biopsy specimens showing tissue changes consistent with sarcoidosis. Although the biopsy specimens revealed normal tissue, the clinical picture and roentgen appearance of the lungs were so typical of sarcoidosis in three patients that the diagnosis was considered justified. Certainly in the diagnosis of sarcoidosis, reliance should be placed on biopsy specimens whenever possible, however, as explained by Sones and associates<sup>2</sup> and Israel and Sones,<sup>3,4</sup> the character of the sarcoid granuloma is nonspecific and the microscopic demonstration of epithelioid tubercles in surgically excised specimens is in itself not sufficient to establish a diagnosis.

#### TREATMENT

In order to individualize treatment, no particular rule was established for selecting ACTH or cortisone therapy. In general, a daily dosage of 25 mg of ACTH in 1,000 ml of 5 per cent glucose was administered intravenously over an eight hour period. Cortisone (300 mg on the first day, 200 mg on the second day, and 100 mg daily thereafter) usually was administered intramuscularly. Hormone therapy was continued until a response was obtained or it became evident that no response would occur. Then cessation of therapy was by gradual reduction of the dosage. Patients were given a regular diet with no added salt. Supplementary potassium was not prescribed routinely. Patients were weighed daily and daily blood pressure determinations were made.

Table 2 shows the established duration of illness prior to the institution of ACTH and cortisone therapy and the duration and results of treatment. The length of the treatment period was based chiefly on the degree of the patient's response, those patients whose response was slight or partial received continued medication in an attempt to effect further regression. When it became evident that no further improvement was likely to result treatment was discontinued.

Ten of the 11 patients treated with ACTH and steroid hormones showed some definite signs of improvement. (Improvement was based on roentgen demonstration of prompt and/or definite regression of pulmonary lesions, or by definite diminution in some of the objective manifestations of sarcoidosis.) When improvement occurred it usually was evident within a week. In many instances, response was so prompt that it seemed to be a significant factor in differentiating the results of treatment from a natural remission. Also, it was observed that recurrences or recrudescences often were evident as soon as 30 days after the cessation of therapy. Impressions gained from the very short term periods of observation indicated that pulmonary parenchymal and lymph node involvement seemed to recur early, whereas, ocular lesions and parotid and lacrimal gland involvement seemed to show more sustained improvement. Some patients received a second course of therapy.

No attempt was made to compare the effects of ACTH versus cortisone therapy. In case 4, it seemed that no reaction whatever was obtained from ACTH, however, the patient did improve with cortisone therapy. No studies were performed to ascertain if an adrenocortical response to ACTH was obtained.

One patient (case 11) received the largest total dosage of cortisone, but no objective signs of improvement or of progression were observed. Chloroquine phosphate, para aminosalicylic acid (PAS), and streptomycin sulfate were administered also.

Case 3 was interesting, because it seemed that this patient's symptoms of polydipsia and polyuria might represent sarcoid involvement of the pituitary gland. ACTH therapy was administered and the patient showed marked subjective improvement with roentgenographic evidence of regression of his pulmonary lesions but no regression of the symptoms of diabetes insipidus. Although ACTH did not alleviate the diabetes insipidus, he was maintained on Pitressin (brand of posterior pituitary pressor and antidiuretic hormone). Unfortunately, as with all of the cases studied, prolonged follow up information was impossible.

Two instances of possible toxic reaction deserve consideration. One patient (case 11) developed such marked subjective improvement that the possibility of euphoria (due to cortisone) was believed to be a factor, however, in .

a complete case history and physical examination were recorded. Any suggestion of tuberculosis, diabetes mellitus, cardiovascular renal disease, or neuropsychiatric abnormality which might contraindicate the use of the steroid hormones was noted. Routine clinical investigation included a complete hematologic examination plus determinations for chemical constituents as serum proteins (with albumin globulin ratio), blood urea, blood glucose (fasting) and serum calcium. Urinalysis, a roentgenogram of the chest and a biopsy of all organs suspected of having sarcoid involvement. When indicated, bone marrow and cerebrospinal fluid examinations and specific tests for liver and renal function were done. For most patients, an ophthalmoscopic examination was performed by a qualified ophthalmologist.

Table 1 gives brief historical and diagnostic data for the series of 11 male patients. Nine patients were Negroes and two were white. Ages ranged from 21 to 35 years. Although one patient (case 8) denied any symptoms, subjective symptoms varied with organ involvement. All patients had some pulmonary manifestations (mediastinal lymph nodes, parenchymal involvement, or both) but predominant chest complaints were recorded in only three instances.

The final diagnosis was based upon the clinical picture, characteristic roentgen appearance of the lungs, hyperglobulinemia, and biopsy specimens showing tissue changes consistent with sarcoidosis. Although the biopsy specimens revealed normal tissue, the clinical picture and roentgen appearance of the lungs were so typical of sarcoidosis in three patients that the diagnosis was considered justified. Certainly in the diagnosis of sarcoidosis, reliance should be placed on biopsy specimens whenever possible; however, as explained by Sones and associates<sup>2</sup> and Israel and Sones,<sup>11</sup> the character of the sarcoid granuloma is nonspecific and the microscopic demonstration of epithelioid tubercles in surgically excised specimens is in itself not sufficient to establish a diagnosis.

### TREATMENT

In order to individualize treatment, no particular rule was established for selecting ACTH or cortisone therapy. In general, a daily dosage of 25 mg of ACTH in 1,000 ml of 5 per cent glucose was administered intravenously over an eight hour period. Cortisone (300 mg on the first day, 200 mg on the second day, and 100 mg daily thereafter) usually was administered intramuscularly. Hormone therapy was continued until a response was obtained or it became evident that no response would occur. Then cessation of therapy was by gradual reduction of the dosage. Patients were given a regular diet with no added salt. Supplementary potassium was not proscribed routinely. Patients were weighed daily and daily blood pressure determinations were made.

Table 2 shows the established duration of illness prior to the institution of ACTH and cortisone therapy and the duration and results of treatment. The length of the treatment period was based chiefly on the degree of the patient's response, those patients whose response was slight or partial received continued medication in an attempt to effect further regression. When it became evident that no further improvement was likely to result, treatment was discontinued.

Ten of the 11 patients treated with ACTH and steroid hormones showed some definite signs of improvement (improvement was based on roentgen demonstration of prompt and/or definite regression of pulmonary lesions, or by definite diminution in some of the objective manifestations of sarcoidosis). When improvement occurred, it usually was evident within a week. In many instances, response was so prompt that it seemed to be a significant factor in differentiating the results of treatment from a natural remission. Also, it was observed that recurrences or recrudescences often were evident as soon as 30 days after the cessation of therapy. Impressions gained from the very short term periods of observation indicated that pulmonary parenchymal and lymph node involvement seemed to recur early, whereas, ocular lesions and parotid and lacrimal gland involvement seemed to show more sustained improvement. Some patients received a second course of therapy.

No attempt was made to compare the effects of ACTH versus cortisone therapy. In case 4, it seemed that no reaction whatever was obtained from ACTH, however, the patient did improve with cortisone therapy. No studies were performed to ascertain if an adrenocortical response to ACTH was obtained.

One patient (case 11) received the largest total dosage of cortisone, but no objective signs of improvement or of progression were observed. Chloroquine phosphate, para-aminosalicylic acid (PAS), and streptomycin sulfate were administered also.

Case 3 was interesting, because it seemed that this patient's symptoms of polydipsia and polyuria might represent sarcoid involvement of the pituitary gland. ACTH therapy was administered, and the patient showed marked subjective improvement with roentgenographic evidence of regression of his pulmonary lesions but no regression of the symptoms of diabetes insipidus. Although ACTH did not alleviate the diabetes insipidus, he was maintained on Pitressin (brand of posterior pituitary pressor and antidiuretic hormone). Unfortunately, as with all of the cases studied, prolonged follow up information was impossible.

Two instances of possible toxic reaction deserve consideration. One patient (case 11) developed such marked subjective improvement that the possibility of euphoria (due to cortisone) was believed to be a factor, however, in most patients showing

TABLE 1 Historical and diagnostic data on 11 male patients with sarcoidosis

Case	Age (years)	Race	Symptoms	Characteristic lesions	Site of involvement	Biopsy specimen
1	23	Negro	Hip pain	Parenchyma	Lung tissue Lymph node	Lymph node—characteristic lesions of sarcoidosis
2	23	Negro	Cough Chest discomfort	Parenchyma	Lung tissue Lymph nodes Skin	Lymph node—characteristic lesions of sarcoidosis
3	21	White	Polydipsia Polyuria	Hilar node	Peripheral and hilar lymph nodes Hypophysis?	Lymph node—characteristic lesions of sarcoidosis
4	35	White	Fever Joint pain	Hilar node	Hilar node Liver	Liver—characteristic lesions of sarcoidosis
5	21	Negro	Nausea Vomiting Fever Weakness	Hilar node Parenchyma	Peripheral and hilar lymph nodes Lung parenchyma Liver Eye Parotid lacrimal and submandibular glands	Liver and lymph node—characteristic lesions of sarcoidosis

TABLE 1 Historical and diagnostic data on 11 male patients with sarcoidosis—Continued

Case	Age (years)	Race	Symptoms	Characteristic lesions*	Site of involvement	Biopsy specimen
6	22	Negro	Cough Respiratory difficulty	Parenchyma	Hilar nodes Lung parenchyma Lacrimal and parotid glands	Lymph node—normal
7	24	Negro	Mass in neck	Hilar node Parenchyma	Lymph node Lung parenchyma	Lymph node—characteristic lesions of sarcoidosis
8	27	Negro	None	Hilar node Parenchyma	Lung parenchyma Hilar nodes	Lymph node—normal
9	23	Negro	Swollen, enlarged peripheral lymph nodes	Hilar node Parenchyma	Lung parenchyma Hilar and peripheral lymph nodes	Lymph node—characteristic lesions of sarcoidosis
10	24	Negro	Enlarged inguinal lymph nodes	Parenchyma	Lung parenchyma Peripheral lymph nodes	Lymph node—characteristic lesions of sarcoidosis
	4	Negro	Fever Malaise Cough	Hilar node	Hilar lymph node	Lymph node—normal

\* treated by roentgenograms of the chest



TABLE 2 ACTH and cortisone therapy and results in 22 male patients with sarcoidosis

Case	Now duration of illness (months)	ACTH therapy		Corticosterpy		Results of treatment
		Total dosage (mg)	Duration (days)	Titration dosage (gm)	Duration (days)	
1	1	445	21			Improved pulmonary manifestations
2	6	310	15			No demonstrable improvement of pulmonary manifestations
3	4	420	19			Complete clearing of pulmonary manifestations. Marked subjective improvement (Patient is "Pittsburgh")
4	2	450	21	2.0	16	No improvement in ACTH response of pulmonary lesion with marked subjective improvement (Patient is "Pittsburgh")
5	5	475	19	2.1	21	Marked improvement in pulmonary manifestations on cortisone. Most marked improvement in pulmonary manifestations from ACTH therapy
6	3	420	20	1.0	10	Definite improvement in pulmonary manifestations. Definite improvement in pulmonary manifestations. Definite improvement in pulmonary manifestations.

TABLE 2 ACTH and cortisone therapy and results of treatment in 11 mild patients with sarcoidosis—Continued

Case	Known duration of illness (months)	ACTH therapy		Cortisone therapy		Results of treatment
		Total dosage (mg)	Duration (days)	Total dosage (grams)	Duration (days)	
7	3			1.2	11	Improved. Definite regression of periphetal lymph nodes and pulmonary manifestations
8	4			5.0	44	Prompt and marked regression of manifestations recurring immediately after cessation of therapy
9	5			4.5	44	Over 50 per cent regression of pulmonary lesions during the first week of therapy then gradual but not complete regression of periphetal lymph nodes and pulmonary lesions
10	4			3.8	33	Definite but not complete clearing of pulmonary manifestations. Prior to cortisone therapy this patient had regression of periphetal lymph nodes with stabilization of pulmonary lesions. Cortisone treatment was begun after roentgenographic evidence of progression of pulmonary lesions
11	8			6.1	41	No improvement. Possibly mild euphoria as a side reaction. This patient also was treated with chloroquine phosphate, streptomycin sulfate and PAS

\*Prior to treatment

Improvement demonstrated by roentgenographic and clinical examinations

TABLE 2 ACTH and cort on therapy and results of treatment in 11 mal patients with sarcoidosis

Ca	How long duration (months)	ACTH therapy		Cortison therapy		Results of treatment
		Total dose (mg)	Duration (days)	Total dose (g m)	Duration (days)	
1	1	445	21			Improved Partial clearing of pulmonary infiltrates
2	6	310	15			Marked improvement of pulmonary manifestations
3	4	420	19			Complete clearing of pulmonary infiltrates Marked subjective improvement (Patient on prednisone)
4	2	450	21	20	16	No improvement of ACTH Remission of pulmonary infiltrates with marked subjective improvement
5	5	475	19	21	21	Marked improvement of lung and parathyroid glands on cortisone No marked improvement with complete clearing of eye lesions of ACTH therapy
6	3	420	20	10	10	Delayed improvement of lung and parathyroid glands and lacrimal glands Elevation of prednisone level with improvement of second course of cortisone but no improvement of pulmonary manifestations

limited experience of treatment with these drugs tends to support this belief

It is worth emphasizing that a diagnosis of sarcoidosis should be well established and differentiated from acute interstitial pulmonary fibrosis prior to the institution of steroid hormone therapy. Peabody and associates<sup>17</sup> reported that withdrawal of these drugs might prove harmful to patients with acute interstitial pulmonary fibrosis (Hamman Rich syndrome)

#### SUMMARY

Eleven patients with sarcoidosis were treated with ACTH and/or cortisone. Pertinent clinical and laboratory data were obtained to establish the diagnosis prior to institution of therapy. Ten of the 11 patients treated with steroid hormones showed some definite signs of improvement, although probably temporary. The aim of treatment should be to maintain the patient until a stage of natural remission occurs.

#### REFERENCES

1. Thorn G W, Forsham P H, Frawley T F, Hill S R, Jr, Roche M, Staebelin D, and Wilson D L. Clinical usefulness of ACTH and cortisone (Medical Progress section) *New England J Med.* 242: 783-793, May 18, 1950; 824-834, May 25, 1950; and 865-872, June 1, 1950.
2. Sones M, Israel H L, Dratman M D, and Frank J H. Effect of cortisone in sarcoidosis. *New England J Med.* 244: 209-213, Feb. 8, 1951.
3. Israel H L, and Sones M. Sarcoidosis. *Am. Pract. & Digest Treat.* 3: 18-21, Jan. 1952.
4. Silzsbach L E. Effects of cortisone in sarcoidosis: study of 13 patients. *Am. J. Med.* 12: 139-160, Feb. 1952.
5. Miller M A, and Bass H E. Effect of acthar-c (ACTH) in sarcoidosis. *Ann. Int. Med.* 37: 776-784, Oct. 1952.
6. Berger A W, and Reisman A S. Renal impairment due to sarcoid infiltration of kidney: report of case proved by renal biopsies before and after treatment with cortisone. *New England J Med.* 252: 44-49, Jan. 13, 1955.
7. Dolphin A, and Heathfield A W G. Sarcoidosis treated with cortisone: report of case. *Lancet* 2: 1160-1162, Dec. 13, 1952.
8. Phillips R W. Hypercalcemia of sarcoid corrected with cortisone. *New England J Med.* 248: 934-936, May 28, 1953.
9. Sullivan R D, Mayock R L, Jones R Jr, and Beerman H. Local injection of hydrocortisone and cortisone into skin lesions of sarcoidosis. *J. A. M. A.* 152: 308-312, May 23, 1953.
10. Silzsbach L E, Posner A, and Medina M M. Cortisone therapy in sarcoidosis: effect in case with virtual blindness. *J. A. M. A.* 147: 927-929, Nov. 3, 1951.
11. Lovelock F J, and Stone D J. Cortisone therapy of Boeck's sarcoid. *J. A. M. A.* 147: 930-932, Nov. 3, 1951.
12. Small M J. Favorable response of sarcoidosis to cortisone treatment. *J. A. M. A.* 147: 932-937, Nov. 3, 1951.
13. Israel H L, and Sones M. Diagnosis of sarcoidosis with special reference to Kveim reaction. *Ann. Int. Med.* 43: 1269-1282, Dec. 1955.
14. McKusick V A. Boeck's sarcoid of stomach with comments on etiology of regional enteritis. *Gastroenterology* 23: 103-113, Jan. 1953.
15. Blum E B, and Mitchell N. Massive gastrointestinal hemorrhage in case of Boeck's sarcoid. *Ann. Int. Med.* 36: 185-195, Jan. 1952.
16. Hodgson C H, and Woolner L B. Diagnosis and treatment of pulmonary sarcoidosis. *M. Clin. North America* 38: 997-1008, July 1954.
17. Peabody J W Jr, Buechner H A, and Anderson A E. Hamman Rich syndrome: analysis of current concepts and report of 3 precipitous deaths following cortisone and corticotropin (ACTH) withdrawal. *A. M. A. Arch. Int. Med.* 92: 806-824, Dec. 1953.

improvement there was an associated sense of well being. The other patient (case 6) had an episode of hematemesis during the second course of cortisone therapy. This may have represented a toxic reaction to cortisone manifested by gastric or duodenal ulceration or it may have been due to sarcoid involvement of the stomach and/or gastro-intestinal tract.<sup>11</sup> Roentgen studies (employing barium) made eight days after the episode of hematemesis failed to demonstrate any abnormality of the stomach or small bowel.

## DISCUSSION

Of the various substances employed in the treatment of sarcoidosis ACTH and the steroid hormones seem to offer the most promise. Although Hodgson and Woolner<sup>1</sup> stated that "most of the good results from therapy are limited to clinical response with little or no alteration in the x ray picture of the lungs," there was roentgenographic evidence of very definite regression of the pulmonary manifestations in most of our patients. Other workers have observed histologic changes in lymph nodes. Siltzbach<sup>4</sup> studied 13 post treatment biopsy specimens from 8 patients and noted slight to marked regressive changes in 10 specimens. Miller and Bass<sup>5</sup> reported a case concerning a patient who had progressive manifestations of sarcoidosis (proved by lymph node biopsy) for two years prior to treatment and response from ACTH. In this case the lymph node biopsy performed after therapy showed an absence of sarcoid involvement and the presence of extensive hyaline changes. Berger and Reiman<sup>6</sup> reported a case of sarcoidosis with renal involvement. Following steroid hormone therapy their patient showed clinical improvement of pulmonary and lymph node manifestations, but histologic studies of the kidney performed before and after treatment showed no change.

Thorn and associates<sup>7</sup> touched upon several important general considerations concerning the use of ACTH and steroid hormones which still seem to be applicable. (1) The physician employing these agents must possess a sound understanding of the multiple metabolic activities of these hormones. (2) the course of therapy undertaken with these agents must be truly individualized, (3) should the clinical response to ACTH administration be inadequate the production of an adrenocortical response should be verified and (4) the decision to employ chronic hormone therapy demands a comparative evaluation of the potential gains and risks involved. On this latter point Israel and Sones stated "It is our belief at present that treatment with cortisone is indicated in patients whose sarcoidosis appears to be recent and fresh. Treatment does not appear to be warranted in patients with chronic disease and few symptoms while a trial of these drugs is advisable in patients with ocular lesions, with pulmonary insufficiency or other manifestations of progressive disease." Our

rather dramatically re-emphasized by Fnos, Holmes, and Bever,<sup>3,4</sup> who reported pathologic studies of the coronary arteries of 200 soldiers killed in Korea. They found coronary disease of significant degree in 77 per cent of those men and severe atherosclerotic change in over 15 per cent. Their average age was 22.1 years, height, 5 feet 7 $\frac{1}{2}$  inches, and weight, 145.8 pounds.

In 1937 Benson<sup>5</sup> stated, "This condition is rare under 30 years and relatively uncommon under 40. To those of us who examine men periodically, prophylactically so to speak, to determine their fitness to fly, the early detection of coronary artery disease is a distinct problem." Today coronary artery disease has become much more commonly recognized in the young, but the problem and its solution remain unchanged nearly 20 years after publication of Benson's article.

### CLINICAL MATERIAL

One hundred and seven patients who suffered myocardial infarction were hospitalized at this base during the five year period terminating 31 December 1955. Eighty-seven of these were members of the military service on active duty. The remainder were retired personnel or dependents of active duty personnel.

**Age.** Table 1 gives the age distribution of the 107 patients. The age range for military personnel was 24 to 60 years. Of the 9 patients aged 60 to 82 years, 6 were dependents, 1 was retired, and 2 were on active duty.

TABLE 1 Age distribution of patients with myocardial infarction

Age group (years)	Civilians		Military personnel		Totals
	Male	Female	Active	Retired	
24-29	0	0	5	0	5
30-39	0	0	30	3	33
40-49	0	2	40	1	43
50-59	2	2	10	3	17
60-69	2	1	2	1	6
70-79	0	2	0	0	2
82	1	0	0	0	1
Total	5	7	87	8	107

**Sex, Race, and Status.** One hundred and two patients were white and five were Negro. One hundred were male and seven were

# MYOCARDIAL INFARCTION IN A MILITARY POPULATION

PHILIP G. KEIL, *Lieutenant Colonel, USAF (MC)*  
LEON V. McVAY, Jr., *MD*

**M**YOCARDIAL INFARCTION has a more serious connotation in the military services than in the general population. To maintain a combat ready force and necessary support elements physical standards must remain high and personnel with history of infarction are likely to be considered unfit for active duty.

Master Jaffe and Dack<sup>1</sup> estimated in 1939 that over one million myocardial infarctions occurred annually in the United States. Since then there has been a greater increase in the frequency of its occurrence than in the population and it is reasonable to assume that there is an increased incidence in the armed services.

In the Army and Air Force an electrocardiogram is required as a part of the annual physical examination of officers 40 years of age and over. We were surprised in the recent past at the number of men whose initial tracings showed unequivocal evidence of previous infarction. In taking the medical history of these men it was possible to date the attack in approximately half of the cases. This observation provoked our investigation of the problem of myocardial infarction in a military population.

We reviewed the clinical records of patients hospitalized with myocardial infarction at this base during the five-year period 1951 through 1955 inclusive. We were particularly interested in advanced coronary artery disease in younger persons and in the retainability of military personnel in the service after infarction.

Attention was focused on coronary artery disease in the young in 1948 by Yater and associates<sup>2</sup> who reported 886 cases in patients under 40 years of age (18 to 39 years). This was

---

Read before the Section on Military Medicine at the annual meeting of the American Medical Association, Chicago, Ill., 11-16 June 1956.

From U. S. Air Force Hospital, Maxwell Air Force Base, Ala. Col. Keil is now assigned to U. S. Air Force Hospital, Lackland Air Force Base, Texas.

Required in the Army for all flag officers, and for other personnel when indicated.

ing state, 10 were exerting themselves mildly to moderately, 5 were exerting themselves strenuously, and in 6 this information was unknown.

**Family History** Family history was negative in 24 patients, positive in 45, and unknown in 18. Family history was negative in 11 of all the patients under 40 years of age, positive in 20, and unknown in 7. In the individuals under 30, the family history was negative in 1, positive in 3, and unknown in 1.

**Type of Infarction** There were 29 posterior myocardial infarctions and 50 anterior infarctions, including septal and lateral, 3 individuals had both anterior and posterior infarctions, and in 5 persons the type was unknown. In all patients under 40, 15 had posterior infarcts, 21 had anterior, 1 had both, and in 1 the type was unknown.

**Use of Tobacco** There were only 2 documented nonsmokers in the series. Ten smoked moderately, that is, less than a package per day. Sixty smoked heavily, that is, more than a package per day, and usually one and one half to two packages. In 15, complete information was lacking. In all patients under 40, there were 2 nonsmokers, 9 moderate smokers, 17 who smoked heavily, and in 10 this information was not recorded.

**Use of Alcohol** There were 6 patients who did not drink, 50 who drank moderately, 16 who drank heavily, and 15 on whom this information was not recorded. In all patients under 40, 5 were nondrinkers, 20 imbibed moderately, 4 heavily, and in 9 this information was not recorded.

**Severity of Infarct** Twelve were classified as mild, 28 moderate, 24 moderately severe, and 23 severe. In all patients under 40, 5 were considered mild, 15 moderate, 11 moderately severe, and 7 severe.

**Outcome** Fifty of the 87 military patients were retired from active duty following their initial infarction with disability ratings of from 60 to 100 per cent (average rating 80 per cent). Thirteen military patients died and 24 were returned to active duty. In only one instance was an individual returned to active duty by the Physical Evaluation Board after the Medical Board had recommended retirement. Of the civilian and retired group, 3 retired military personnel and 2 civilians died, 5 retired military personnel and 10 civilians survived.

## DISCUSSION

Our primary interest in collecting these data was to investigate the outcome of the cases and find the number of persons who returned to effective military duty. Secondly we were interested in clinical features, age groups, habitus, habits, etc.



female. All of the females were dependents. Eighty seven were active duty personnel, 8 were retired, and 12 were dependents.

**Seasonal Incidence.** Most of the infarctions occurred during spring and summer, contrary to many reported series and general belief. The occurrence by months is given in table 2. It was not possible to determine accurately the month of infarction in five of the civilian patients, since the unrecognized infarction had occurred previously, and the patient had been referred to this hospital for treatment of residuals.

TABLE 2 *Month of occurrence of myocardial infarction among 107 patients*

Month	Number of patients	Month	Number of patients
January	3	July	8
February	3	August	15
March	11	September	7
April	16	October	9
May	14	November	3
June	8	December	5
		Unknown	5

**Body Build.** Body build was determined only on active duty military personnel according to the height weight standards cited by Duncan.<sup>4</sup> Forty seven were obese, 28 were within the average range, 7 were underweight, and in 5 this information was lacking. In all patients under 40 years of age, 17 were obese, 14 were average, 4 were underweight, and in 3 this information was unknown.

**Angina.** Of the 87 persons on active duty, a history of angina was present in 27, absent in 52, and undetermined in 8. In all patients under 40 years of age, angina was present in 9, absent in 25, and undetermined in 4.

**Hypertension.** A moderate degree of hypertension was present in 15, 66 were normotensive, and in 6 this information was not available. In all patients under 40 years of age, 4 were hypertensive, 31 normotensive, and in 3 this information was lacking.

**Predisposing Factors.** With reference to physical activity at the time of infarction, the following pertains: 20 patients were sleeping, 30 were awake but in a resting state, 19 were mildly to moderately active, 6 were performing strenuous physical exercise, and in 12 this information was lacking. Among all patients under 40 years, 8 were sleeping, 9 were awake in a rest

ing state, 10 were exerting themselves mildly to moderately, 5 were exerting themselves strenuously, and in 6 this information was unknown.

**Family History** Family history was negative in 24 patients, positive in 45, and unknown in 18. Family history was negative in 11 of all the patients under 40 years of age, positive in 20, and unknown in 7. In the individuals under 30, the family history was negative in 1, positive in 3, and unknown in 1.

**Type of Infarction** There were 29 posterior myocardial infarctions and 50 anterior infarctions, including septal and lateral, 3 individuals had both anterior and posterior infarctions, and in 5 persons the type was unknown. In all patients under 40, 15 had posterior infarcts, 21 had anterior, 1 had both, and in 1 the type was unknown.

**Use of Tobacco** There were only 2 documented nonsmokers in the series. Ten smoked moderately, that is, less than a package per day. Sixty smoked heavily, that is, more than a package per day, and usually one and one half to two packages. In 15, complete information was lacking. In all patients under 40, there were 2 nonsmokers, 9 moderate smokers, 17 who smoked heavily, and in 10 this information was not recorded.

**Use of Alcohol** There were 6 patients who did not drink, 50 who drank moderately, 16 who drank heavily, and 15 on whom this information was not recorded. In all patients under 40, 5 were nondrinkers, 20 imbibed moderately, 4 heavily, and in 9 this information was not recorded.

**Severity of Infarct** Twelve were classified as mild, 28 moderate, 24 moderately severe, and 23 severe. In all patients under 40, 5 were considered mild, 15 moderate, 11 moderately severe, and 7 severe.

**Outcome** Fifty of the 87 military patients were retired from active duty following their initial infarction with disability ratings of from 60 to 100 per cent (average rating 80 per cent). Thirteen military patients died and 24 were returned to active duty. In only one instance was an individual returned to active duty by the Physical Evaluation Board after the Medical Board had recommended retirement. Of the civilian and retired group, 3 retired military personnel and 2 civilians died, 5 retired military personnel and 10 civilians survived.

## DISCUSSION

Our primary interest in collecting these data was to investigate the outcome of the cases and find the number of persons who returned to effective military duty. Secondly we were interested in clinical features, age groups, habitus, habits, et cetera.

This group varies little from other series as regards mortality family history, antecedent history of angina, hypertension, body build and smoking and drinking. As a rule the younger individuals had previously been athletically inclined and in robust health. They attained a grade commensurate with supervisory positions and sedentary habits, gained weight and smoked and drank more. Most suffered their infarcts without a period of progressive angina and while they were physically idle.

It was apparent from study of this group of patients that the diagnosis of myocardial infarction is not entertained as early or as seriously in the young patient as in the older one. Diagnoses such as spontaneous pneumothorax, acute serofibrinous pericarditis, pleurodynia and gastroenteritis are frequently considered first. Fortunately the almost routine use of the electrocardiogram in the differential diagnosis of chest and epigastric pain has done much to correct erroneous first impressions.

We were unable to obtain an accurate follow up on the 24 military personnel who returned to active duty. We do know that a number of the 50 who were retired had first been sent on a "trial of duty" for a few weeks or months. Why were they unable to perform sedentary duties? In general we found that they were not considered acceptable for retention by medical officers. Often if the ex-patient complained of the slightest symptoms referable to the heart and related to the physician his history of hospitalization for a myocardial infarction, he was returned to patient status with a recommendation for action by a Physical Evaluation Board. Many patients were told that they would be retired after due hospitalization and might expect a high percentage of physical disability retirement.

A simple solution of the problem would be to retire all persons with myocardial infarction, however we are trying to retain highly motivated and skilled personnel despite borderline physical defects. Obviously if we are to return any of these individuals to active duty military physicians must take a more receptive attitude toward their retention and must appreciate the difference between "fully qualified" for active duty and "acceptable for retention" on active duty.

We believe that definite criteria should be established for retainability after myocardial infarction unless we agree that all should be retired. What should the criteria be? Let us first itemize those findings which would preclude return to duty of those surviving a first infarction irrespective of age: (1) serious disturbance of cardiac rhythm (2) significant cardiomegaly (3) cardiac failure (4) prolonged shock (5) recalcitrant angina (6) incapacitating dyspnea and (7) serious thromboembolic complications.

There remains a group of individuals who have none of these, but who did have, unmistakably, a myocardial infarct. These people recover completely, are asymptomatic on moderate activity, and have a normal sized heart and normal circulation. We believe these persons should be retained on active duty, because many are well qualified and motivated noncommissioned and commissioned officers. Such a policy, if put into effect, should be publicized to medical personnel, and these people should not be treated as invalids after return to duty. We are inclined to agree with Walker,<sup>7</sup> who concluded "To restrict the activity of a patient who has survived myocardial infarction without residual cardiac or coronary insufficiency probably shortens his actual survival and surely shortens his useful life."

The decision regarding return to flying status is extremely important to those previously on flying duties. We believe that, after six months from the date of infarction, if cardiovascular examination is normal and the individual asymptomatic, he could be returned to flying status as a crew member not in primary control of the aircraft, or as a pilot in primary control in a dual control aircraft with another qualified pilot. This, of course, is our opinion derived from a strictly medical point of view, and has no inference as far as Air Force policy or suggested policy is concerned.

Since the report by Benson in 1937 of a pilot sustaining a coronary thrombosis while flying, there have been several similar instances recorded in military and civilian pilots. Although thrombosis occurs most often during the sleeping and resting state, it is reasonable that chance alone would dictate its occasional occurrence while flying. When one ponders the number of people with advanced coronary disease who fly in commercial and private aircraft, and considers the fact that a small amount of hypoxia may occur in flight even in pressurized aircraft, it is amazing that coronary thrombosis in flight is not rather commonplace.

#### SUMMARY

One hundred and seven patients were treated for myocardial infarction at this base in the five year period ending 31 December 1955. Fifty seven of these were active duty military personnel, 8 were retired personnel, and 12 were civilians.

Thirty eight infarctions occurred in patients below the age of 40. Most of the 107 infarctions occurred during the summer months, while the patients were sleeping or resting. They usually occurred without a history of angina in individuals who were nonobese but inclined to be obese, who smoked heavily, drank moderately, had a sedentary job, and had a family history of cardiovascular disease.

Thirteen of the 87 active duty military personnel died as a result of infarction 24 returned to duty and 50 were retired with an average disability rating of 80 per cent

We believe that those individuals suffering relatively mild myocardial infarction without objective or subjective sequelae should be returned to duty This will require intelligent management by base medical personnel to eliminate unnecessary referral of persons with only slight or equivocal symptoms for hospitalization and evaluation

#### REFERENCES

- 1 Master A M, Jaffe H L and Duck S. Prevalence of coronary artery occlusion. *New York State J Med* 39 1937 1940 Oct 15 1939
- 2 Yater W M, Traub A H, Brown T G, Fitzgerald R P, Giller M A and Wilcox B B. Coronary artery disease in men 18 to 39 years of age report of 866 cases 450 with necropsy examinations. *Am Heart J* 36: 334-372 Sept 481-526 Oct 683-722 Nov 1949
- 3 Enos W F, Holmes R H and Beyer J C. Coronary artery disease among United States soldiers killed in action in Korea preliminary report. *J A M A* 152 1090-1093 July 18 1953
- 4 Enos W F, Jr, Beyer J C and Holmes R H. Pathogenesis of coronary artery disease in American soldiers killed in Korea. *J A M A* 158 912-914 July 16 1955
- 5 Benson O O Jr. Coronary artery disease report of fatal cardiac attack in pilot while flying. *J Aviation Med* 8: 81-84 June 1937
- 6 Duncan G G (editor). *Diseases of Metabolism* 3d edition W B Saunders Co Philadelphia Pa 1952 p 1106
- 7 Walker W J. Needless restriction of patients with bilateral myocardial infarction. *U S Armed Forces M J* 3: 1717-1723 Dec 1954

---

#### PAGING PATHOLOGISTS

The acute shortage of pathologists is an ever-recurring topic at national medical meetings. It is estimated that the total number of pathologists in the United States should be doubled to meet the needs of practice, teaching, and research. More and more hospitals have been adding pathologists to their staffs since World War II. The recognition of the important role of the pathologist in clinical medicine and resident training has placed the pathologist in a strategic position of great demand. Many new research programs involve studies in pathology. The military services which have trained essential large forces in this country and require pathologists

—HAROLD L STEWART M

4 Public Health Reports

July 1955

# PRESERVED ERYTHROCYTES IN Rh ANTIBODY TESTING

FRANK W. CHORPENNING *Lieutenant Colonel MSC USA*

ALLEN A. YOUNG *Sergeant First Class USA*

RAYMOND W. BOUDREAU *Sergeant USAR*

**I**N erythrocyte testing, especially in Rh typing, it has long been axiomatic that fresh cells should be used. Hattersley and Fawcett<sup>1</sup> and Wall, Jynne, and Benuchamp<sup>2</sup> have recommended the use of cell suspensions preserved in a manner similar to that used for sheep cells in the complement fixation<sup>3</sup> and heterophil procedures. Even though this would be helpful in solving problems of cell procurement and test variability, recently published methods of Rh antibody testing still specify the use of fresh cells as a source of antigen.<sup>4,5</sup>

In view of the foregoing, and since preserved cell preparations have become available commercially, wider acceptance of this method appears indicated. Therefore, the following data are presented as further confirmation of the feasibility of using such preserved cells for Rh antibody titrations.

## METHODS

The modified Alsever's solution contained 2.05 per cent dextrose, 0.8 per cent sodium citrate, 0.42 per cent sodium chloride, and 0.055 per cent citric acid in doubly distilled water. This was dispensed in bottles with rubber caps and sterilized by autoclaving. Blood to be preserved was injected aseptically into an equal quantity of the preservative solution. The bottle of preserved cells was then stored at approximately 6°C until required for use.

When cells for testing were desired, a portion was removed aseptically with a sterile syringe and 20 gage needle, after the surface of the rubber cap was swabbed with 70 per cent alcohol. These cells were then washed three times in physiologic saline solution and resuspended to a 2 per cent suspension in saline or albumin, as required for testing.

---

From USAREUR Medical Laboratory, Landstuhl Army Air  
Germany. Col. Chorpenning is now assigned to Brooke  
Houston, Tex.

TABLE 2 *Titers of anti D serum pool with fresh and preserved cells Lo*

Blood specimen	No	Preservation period					
		1st week	2d week	3d week	4th week	5th week	6th week
Fresh	Lo 1	16 16	16 16	16 8	16 8	(16) 16	(16) 8
Preserved							
Fresh	Lo 2	16 16	16 16	16 8	(16) 16	(16) 16	(16) 8
Preserved							
Fresh	Lo 3	16 16	16 16	(16) 16	(16) 16	(16) 16	
Preserved							
Fresh	Lo 4	16 16	16 16	(16) 16	(16) 16		
Preserved							
Fresh	Lo 5	16 16	(16) 16	(16) 16	(16) 16		
Preserved							

Titers in parentheses were secured with fresh Yo cells in parallel testing

sequence of preservation Table 4 presents results of 27 different tests with these preserved cells against 9 different antisera produced in the course of maternal immunization. It can be seen from the repeat testing with different cell suspensions that preservation and incidental aging had no appreciable effect on cell reactivity during the period of observation. Also it is evident that the method is suitable for titrating agglutinins as well as for incomplete antibodies.

TABLE 3 Summary of titer variations against two anti D serum pools with preserved cell suspensions as compared with fresh cells

Cell	Fresh cells			Preserved cells		
	No change	Up	Down	No change	Up	Down
Cell Yo	55	1	3	70	5	2
Cell Lo	52	0	0	37	0	12
Cell Mo	5	0	0	14	0	0
Total	112	1	3	121	5	14

### DISCUSSION

The academic question remains as to whether slight effects of preservation can actually be detected. Therefore, the data were subjected to statistical analysis to determine the significance of observed differences between titers secured with fresh and preserved cells. Because they have a direct bearing on the results, differences in reactivity of different cells were also examined. For simplicity, results of tests with the first 10 cell suspensions (tables 1 and 2) were divided into two types of reactions: (a) no change in titer from the mode and (b) change in titer. This was considered valid because the large majority of tests yielded like titers for a given serum and because variations were no greater than one dilution from the mode. Table 5 shows these data for both fresh and preserved cells from donors Yo and Lo, tested against antiserum pool No. 1, and from donor Mo, tested against pool No. 2. The standard error of the difference between tests with fresh Yo cells and preserved Yo cells was 0.056, while the observed fractional difference was 0.040, leading us to conclude that the observed variation was due to chance. Similar comparison between fresh and preserved Lo cells yielded a significant difference, primarily due to decreases in titer. Most of these occurred in but 2 of the 25 cell suspensions. Therefore, it would appear probable that it was due to some factor not intrinsic to the preservation technique. There was no detectable difference between fresh and preserved Mo cell suspensions.



# DIFFERENTIATING BACTERIAL FROM VIRAL PHARYNGITIS AND TONSILLITIS

## A Rapid (Presumptive) Method

MONROE H. GREEN, M.D.

**T**HE PROBLEM of distinguishing pharyngitis and tonsillitis caused by bacteria (most commonly beta hemolytic streptococcus) from that caused by a virus is not always easy on purely clinical grounds.<sup>1</sup> Delay in starting penicillin therapy of streptococcal pharyngitis may permit sensitization of the patient to the organism or to its products with subsequent development of rheumatic fever or acute diffuse glomerulonephritis.

In the northeastern United States, approximately 75 per cent of the pharyngitis and tonsillitis encountered is caused by viruses with the remainder probably caused by beta hemolytic streptococcus.<sup>2</sup> Here in the Southwest, the prevalence of streptococcal infection may be lower; certainly it is not higher. Thus it is not rational to treat all patients with sore throats even those with exudate and cervical adenopathy with penicillin because of the risk of penicillin sensitivity reactions (1.2 per cent of patients treated with aqueous crystalline penicillin and 1.4 per cent or higher treated with repository types<sup>3</sup>). There is the further problem of creating penicillin fastness in normal pharyngeal saprophytes which may under rare conditions become pathogenic.

This study indicates that simple microscopic examination of tonsillar or pharyngeal exudate by direct smear may afford an accurate rapid diagnostic aid in differentiating bacterial (most commonly group A hemolytic streptococcal) from viral pharyngitis or tonsillitis.<sup>4</sup> The technic is neither new nor original but the test is more frequently omitted than used.

## MATERIALS AND METHOD

A study undertaken during the fall, winter, and early spring of 1955-1956 was made of 40 patients with clinical acute pharyngitis or tonsillitis with or without cervical adenitis. Their ages

---

Consultant in medicine and cardiovascular diseases, 3525th U. S. Air Force Hospital, Williams Air Force Base, Arizona. Dr. Green is now at 2021 North Central Ave., Phoenix, Arizona.

With the technical assistance of Mary T. Drake, B.S., A.S.C.P., A.S.M.T.

ranged from 12 to 68 years, with equal distribution of the sexes. As nearly as could be determined clinically, all were seen from 24 to 36 hours after onset.

After careful inspection of the throat, the exudate or reddened area was swabbed with a cotton applicator and the applicator rolled out gently on a glass slide. The slide was fixed in a Bunsen flame and Wright's stain applied as for a blood smear. This stain was used rather than Löffler's methylene blue because it would provide the added detail of differentiating eosinophilic from neutrophilic leukocytes and perhaps demonstrate an underlying or accompanying allergic pharyngitis. This technique usually demonstrates the predominant cell of the exudate. All patients with predominantly neutrophilic or eosinophilic leukocytes in the exudate were given three 500 mg (600,000 unit) doses of aqueous procaine penicillin G suspension intramuscularly—the first immediately, the second in 24 hours, and the third 36 hours after the first dose. The response to this therapy was measured by the speed with which fever, pharyngeal inflammation, and cervical adenopathy subsided and by the general condition of the patient after 24 hours of therapy.

Seven patients among those who had mononuclear cells predominating in their exudate were also given penicillin after throat cultures were obtained. These were selected at random, the purpose being to use the lack of response to penicillin as evidence of the viral origin of their infection, or, at least, of the absence of beta hemolytic streptococci as a causative agent.

## RESULTS

In 26 cases with polymorphonuclear neutrophils predominant in the exudate, 22 had positive cultures for beta hemolytic streptococci. In the remaining 4, this cellular response heralded a hemolytic staphylococcus infection.

All 22 patients with positive hemolytic streptococcus cultures and polymorphonuclear neutrophils in the smear made a good response to penicillin therapy, with rapid subsidence of all symptoms in from 12 to 36 hours. The 4 patients with hemolytic staphylococcus infections made a moderately good response, with subsidence of symptoms in 48 hours.

In contrast, 13 patients with mononuclear cells in their exudate showed no hemolytic streptococci or staphylococci in their cultures. One of these patients had acute infectious mononucleosis with a pharyngeal membrane and predominantly mononuclear cells on smear examination. Seven of the 13 were treated with penicillin but made no response and had a course identical with those treated purely symptomatically, with fever and sore throat lasting

One patient with predominantly mononuclear cells in the pharyngeal exudate had a positive culture for beta hemolytic streptococcus but received no penicillin. He fortunately developed no sequelae to his infection.

It should be emphasized at this point that the apparent predominance of streptococcal and staphylococcal sore throat in this series does not reflect the incidence in the community, out only in 40 patients with a variety of chronic pulmonary and cardiac conditions who presented themselves at the office for treatment of acute sore throat.

Other causes of polymorphonuclear neutrophilic pharyngeal exudates not encountered in this study include fusospirochetal infection, late complications of the common cold, late stages of viral pharyngitis and of course diphtheria which should always be kept in mind in the differential diagnosis of sore throat. Fusospirochetal pharyngitis usually responds well to penicillin as may the late bacterial complications of the common cold and viral nasopharyngitis. The latter two diseases were believed ruled out by history since all patients were seen within 24 to 36 hours after onset.

A source of error in this method of study is the fact that many viral infections such as the common cold or viral nasopharyngitis may be characterized in their late stages by a leukocytic response in the nasopharyngeal or pharyngeal exudate. At this stage they may also respond well to penicillin as a result probably of invasion by penicillin susceptible bacteria or coincidentally. An attempt to counter this error was made by selecting patients believed to have had sore throats of only 24 to 36 hours duration.

Another pitfall is the use of culture alone rather than in conjunction with serologic typing of the recovered streptococci. All pathogenic streptococci in the nasopharynx and pharynx are in group A and can be so classified only serologically.

About 1 or 2 per cent of normal adults harbor these organisms in their throats; these patients conceivably might have a viral pharyngitis yet yield pathogenic streptococci on culture and typing.<sup>3</sup> It is recognized therefore that the recovery of beta hemolytic streptococcus from the throats of patients with acute pharyngitis of short duration can be considered as only presumptive evidence of its causative relationship to the pharyngitis. Further delay in response to penicillin may occur in streptococcal infections but the criterion of speed of response was used not alone but in combination with other criteria listed and it is believed that it has some significance when considered in that light.

## SUMMARY AND CONCLUSIONS

A rapid, simple method for the presumptive diagnosis of hemolytic streptococcal sore throat is suggested that is easier than either differential white blood cell count or throat culture. It uses Wright's stain for study of a smear of pharyngeal exudate. If there is a predominance of neutrophils, the infection may be considered to be bacterial, probably streptococcal, and should be immediately treated with penicillin. If the exudate is predominantly composed of nucleolar or epithelial cells, the infection may be regarded as viral and antibiotic therapy withheld, at least until a culture is obtained.

This method was used in 40 patients with acute pharyngitis or tonsillitis, who were seen from 24 to 36 hours after onset of illness. Pharyngeal smears from 26 indicated the presence of bacterial infection, which was confirmed by culture. The 22 patients with beta hemolytic streptococcus showed a dramatic response to penicillin in 12 to 36 hours, and 4 with hemolytic streptococcus had a fair response to penicillin in 48 hours. Pharyngeal smears of 13 patients indicated the absence of bacterial infection. Cultures in this group did not grow beta hemolytic streptococcus, and 7 of the 13 were treated with penicillin without effect.

This series is a small one, but it is believed that the method deserves further study, using serologic typing of the organism recovered on culture and making certain, if possible, that one is not dealing with the bacterial complications of the common cold or viral nasopharyngitis, or with coincidental nasopharyngitis in a carrier of group A streptococci.

## REFERENCES

- 1 Uses of antibiotics: sulfonamides, ACTH and cortisone in diseases of internal medicine: panel discussion *Pennsylvania M J* 55: 42-50 Jan 1952.
- 2 Lepper M H et al. Symposium on antibiotics: studies on hypersensitivity to penicillin: incidence of reactions in 1303 patients. *J Clin Investigation* 28: 876-831 Sept (pt 1) 1949.
- 3 Commission on Acute Respiratory Diseases. Endemic exudative pharyngitis and tonsillitis: etiology and clinical characteristics. *J A M A* 125: 1163-1169 Aug 26, 1944.

# DEVELOPMENTS IN SOCIAL PSYCHIATRY

## Observations in Five Selected English Hospitals

DENNIE L. BRIGGS *Lieutenant MSC USN*  
LINA STEARNS *Lieutenant Commander NC USN*

**F**OR MORE than a month we were fortunate in being able to spend full time with the staffs and patients of five unique English hospitals for the treatment of emotional disorders—hospitals selected as representative of the more recent trends in social psychiatry with emphasis on institutional management and treatment.\* We were interested in knowing about (1) the types of illness treated within the hospital setting (2) the actual process and extent of behavioral change and (3) the specific procedures that had evolved. We wanted to see what had been achieved by applying these techniques over a considerable period of time in order to better evaluate the psychiatric admissions program that was begun at this hospital by Dr. Harry A. Wilmer, following a visit to England a year ago. In less than one year the results of using these methods in a military setting had been more immediate and far reaching than anticipated considering that in the English hospitals these social psychiatric methods had been in use for 8 to 10 years and more.<sup>1-3</sup>

This report will describe our impressions of the five hospitals and discuss some of the areas and techniques that we believe will be of value in other hospital settings particularly within the armed services.

### BELMONT HOSPITAL

Fourteen days were spent in the Social Rehabilitation Unit of Belmont Hospital, in Sutton, south of London. The unit is housed in a building over one hundred years old, formerly used as a work house. It was badly blitzed during World War II and still shows

---

From U. S. Naval Hospital Oakland, Calif. Sponsored by the Neuropsychiatry Branch Bureau of Medicine and Surgery Research Project NM 007 090 21. Commander Harry A. Wilmer, MC, USNR, principal investigator. Lt. Briggs is now assigned to U. S. Naval Hospital Navy 3923, FPO San Francisco, Calif.

We wish to thank Sir Walter McClay and Doctors Maxwell Jones, T. P. Res Thomas, and Johanna Biele and their staff for time spent allowing us their treatment methods.

We are indebted to Dr. Louis Minsky and Miss Phyllis Arnold for arranging for us to live in during our stay in order to participate in the entire day (and night) of the patient's resocialization.

evidence of the bombings. The hospital is an open ward hospital of 400 patients, emphasizing physical treatment of the neuroses. The unit of about 100 male and female patients is run autonomously, but under the management of the hospital proper. Patients are referred to the unit from all parts of England by courts, physicians, and psychiatrists. They represent the various character and behavior disorders and some neuroses. Many are those traditionally referred to as "psychopaths," with social backgrounds replete with thievery, various types of addictions, sexual delinquency, and continual inability to make social and vocational adjustments. They are admitted for an undetermined time, however, the average stay is from four to six months, and no patients remain longer than a year.

The staff consists of the Medical Director, Dr. Maxwell Jones, three other psychiatrists, a head nurse (sister), two male staff nurses, a night nurse, a psychiatric social worker, a psychologist, four work shop instructors, two secretaries, and two domesticities. In addition, there are two Ministry of Labour Disablement Resettlement Officers (DRO's) who assist in obtaining employment for patients upon their discharge from the hospital.

The unit "is designed to help patients overcome their social fears and problems and to readjust to life outside." The idea of the therapeutic community originated nine years ago with Maxwell Jones from his experiences with rehabilitation of prisoners of war who needed to become resocialized before returning to their communities. "Similarly, patients in the unit needed comparable assistance in learning new values and ways of readjusting to society."

The fundamental aim in treatment is socialization of the patient, and the unit is designed to create a therapeutic atmosphere

where patients can (see) themselves as they really are. By so doing they can begin to learn to understand and if possible modify their behaviour through analysing their everyday relationships. Another aim of treatment is to give practical help in finding work and adjustment to the family outside."

The actual workings of the unit can perhaps best be described by the following account given by the sister:

At least one third of the day is spent in one group or another. It is here that the unit life differs from ordinary life for much of the treatment is based on trying to understand by talking freely the source of difficulty in relationships between people. The lessons learned in these psychotherapeutic groups are related to social life outside.

1 The whole community of patients and staff totaling about 120 people meets every morning from 8 30 to 9 45 a m. People sit where they like in a circle two or three deep. There is no formal chairman the doctor normally acts as timekeeper. Any topic can be discussed and raised by any patient or staff member. Thus the range of topics may include a discussion on drunken behaviour stimulated by an alcoholic s drinking bout the night before talking after lights out homosexuality pairing off complaints about the hot water system or missing light bulbs or criticism or praise of other patients and members of staff et cetera.

2 From 9 45 to 10 15 a m the patients have coffee in their cafeteria and the staff meet in the medical director s office for tea and a discussion on the meeting. An attempt is made to analyse and understand some of the various factors contributing to the tensions as seen in the previous meeting. In addition the staff meets twice a week for an hour to discuss and analyse staff tensions et cetera.

3 At 10 15 a m each doctor takes his patients in a therapeutic group. Three doctors have two groups of 45 minutes each. The other doctor prefers to treat all 25 patients in one group for one and one half hours.

4 After lunch each ward takes it in turn to have a weekly ward meeting from 12 30 to 1 p m. A doctor a sister social therapists and patients of the ward are present. Again any topic may be discussed.

5 The social therapists have a tutorial seven days a week with each member of the permanent staff in turn.

6 The instructors meet weekly to discuss workshop problems.

7 The domestic staff meets with the sister weekly to discuss domestic problems.

8 Every Wednesday a family group is held during visiting hours.

One of the unique forms of treatment is the work group to which each patient is assigned upon entering the unit. These work groups were created to give the patient opportunity to contribute to the maintenance of the unit in a meaningful way as well as to be therapeutic.

The activities include painting the interior of the hospital (the patients decide on the color of the paint to be used when a particular room will be painted and the manner in which it is to be painted) caring for the grounds of the unit and providing fresh

lowers for the hospital. The workshop group repairs and constructs furniture for the unit, the tailoring shop group makes and mends the patients' clothing, and the home group is responsible for cleaning the wards and other parts of the unit. Patients are required to spend a certain number of hours in the work groups and are assigned to keep a formal record of tardiness and absenteeism, which in turn is fed back to the entire community by name and by work group, thus providing for a spirit of competitiveness between the various work groups. The workshop instructors hold a weekly group meeting with the patients assigned to their particular group, and problems concerning work and interpersonal relations involved in the working situations are discussed and resolved.

There is an intensive program of social activities in the unit centering around a club room where nightly dances and other forms of social activities are run by the patients. Television is not permitted, because it would decrease socialization.

Efforts are made to extend the therapeutic process beyond the hospitalization of the patient, and along these lines a family group is held weekly composed of relatives who are interested in coming to the hospital to learn more about themselves and the patient, various staff members, and non-interested patients. This weekly group frequently includes as many as 50 members, and its success is measured in part by the frequent and regular visits of some of the relatives. An ex-patients' group meets one night per week at St. George's Hospital in London, where any former patient may come to talk about problems, renew old acquaintances, or gain courage to continue on in his daily life.

Much of the success of the treatment lies in the "social therapists," who are 11 young girls primarily from the Scandinavian countries and Holland. They have various backgrounds but usually are interested in one of the social sciences, like to be with people, and come to the unit for six to eight months to observe its functioning and to see the country. Their training, though informal, is intense consisting of afternoon tutorials seven days a week with the permanent staff. Here they are given a basic understanding of normal growth and development and opportunity to learn about interpersonal relations from their daily experiences with the patients. Current anxieties are thus used in a therapeutic manner through the daily tutorial, which carries through the basic concepts of the therapeutic community by extending its methods to the staff as well as to the patients. That the girls are foreigners seems to be advantageous, as the patient who cannot adjust to society also feels he is a stranger and can accept her more readily than an English girl who might have prejudices, even at an unconscious level, which would hinder the treatment process. Their role is to



son with whom the patient can learn techniques of social relations and in the treatment program they encourage communication and feedback between patients and between patients and staff.

### WARLINGHAM PARK HOSPITAL

This is a 1200 bed mental hospital in Warlingham Surrey, which is run entirely with open wards and treats all types of mental disorders including chronic schizophrenic patients. The hospital is located in the countryside of southern England, slightly isolated from even the nearest small community. All traditional types of psychiatric treatment are used here, including deep insulin coma electroshock psychosurgery (leukotomy) and the new tranquillizing drugs. The patients are admitted to two admission treatment units for male and female patients about 50 of each. They remain here until their illness has become stabilized and they are able to go on to other wards. Many leave the hospital directly from these units but some remain as long as three or four months on active physical treatment before moving on to another unit.

We were especially interested in the management of the more severely disturbed patients on open wards and visited two such "refractory" wards (one for males and one for females). The staff of the disturbed ward for approximately 40 male patients consisted of two male nurses and one female student occupational therapist (visitor from the Menninger Clinic).

One of the most impressive procedures at Warlingham Park is the use of patients in the treatment program. Alcoholic patients are successfully used as instructors for older psychotic patients teaching them crafts such as weaving crocheting et cetera.

One is continually impressed with the degree of therapeutic sophistication of the entire staff of the hospital. All personnel are thoroughly familiar with the aims of treatment and seem to be highly skilled in carrying them out in all situations. The role of the nursing staff has been considerably modified from that in most mental hospitals as the superintendent reiterated how he concentrated on meaningful occupations for the staff as well as the patients.

### CHAMPION HOUSE

This hospital is a lovely old English estate in the countryside some 10 miles from Warlingham Park. It has about 30 male and female patients who from a social and psychiatric standpoint are not considered ever able to be discharged from a mental institution. These patients have been hospitalized for a long time and have no family or friends to return to but are able to care for themselves within this type of setting to perform

normal tasks contributing to running the home. The staff of this unique hospital consists of a nurse and two or three domestic employees, and the major part of running the house and grounds is done by the patients.

Most of the patients have been hospitalized a good deal of their lives, one of the modern day tragedies of mental institutions. The driver who took us to the hospital remarked, "had we known 20 years ago the things about treatment we know today, these patients wouldn't be here." One patient had been hospitalized over 50 years.

### CASSEL HOSPITAL

Cassel Hospital is primarily for treatment of neuroses by intensive psychotherapy. It is an entirely open hospital, and physical treatment is not used. The orientation is psychoanalytic, and most of the permanent staff have had a high degree of training in psychoanalytic theory and technique. The head nurse is a qualified lay analyst, several other nurses have been analyzed, and one is an analytic candidate. The nurses do not wear uniforms or make ward rounds, but each has a specific function that is used therapeutically in working with the patients. Nurses are encouraged to work at tasks they enjoy doing, thus being models for the patients. One nurse, for example, enjoys sewing and keeps her machine in an easily accessible stair landing at the hospital. Patients may join her or drop by to visit. Through meaningful work which the nurse enjoys, the opportunity for social relations is extended in a manner which facilitates more rapid and complete recovery than could be achieved by a nurse in a white uniform seeing to keeping the ward in spotless order. Although the treatment is centered about individual intensive psychotherapy, the patients run the hospital to a large degree. Most practical matters in its administration are handled quite formally by committees, and decisions reached by the patients are carried through. The matter of patients' letters being stolen from the mailboxes was brought up by a committee of patients and staff. The larger community had decided that this was the staff's responsibility and that they should take steps to end the pilfering. When Dr. Main, the Medical Director, pointed out that the staff's responsibility ended legally when they accepted the mail from the post, the committee considered other means. Various methods were considered, including reporting the matter to the police and bringing in plain clothesmen. The staff deflected the responsibilities to the patient committee, who worked out a solution to ensure safekeeping of their mail, and this was taken back to the community for final approval.

One of the unique features of this hospital was the admission of the patient's husband or wife and children if necessary, based on the promise that emotional illness is nothing to keep

the family and that they may in fact aid in the treatment process. Some of the mothers have to bring their children as they have no means to provide for them while hospitalized. The entire atmosphere of the hospital was natural rather than institutional.

Education and training of the staff is stressed continually and at all levels. The program includes informal training through working under close supervision with a highly trained staff and formalized presentations of carefully developed theories of personality development but it always emphasizes the normal personality rather than abnormal states. In the summer a course is given for nurses outside the hospital dealing with growth and development and helping the nurse to see her role in relation to the patient's treatment.

### MARLBOROUGH DAY HOSPITAL

This institution bears little resemblance to a hospital in the usual sense of the word. It is located in London and treats about 100 patients who come to spend the day in intensive treatment and return to their families or homes at night. The underlying philosophy is that total hospitalization might be undesirable or even harmful by interfering with readjustment to society. An intensive treatment program includes individual psychotherapy, group psychotherapy, and recreational and occupational activities as well as social ones. There is an evening clinic for those patients who cannot receive treatment during the day because of their work schedules or who are reluctant to ask their employer for time off for fear he may not understand emotional illness and they might lose their jobs. Meeting crises with direct action thereby giving the patient hope and getting him into treatment sooner is used frequently in the practical approach by Dr. Joshua Bierer and his staff at this hospital.

The hospital maintains a large number of "social therapy clubs" in the London area and throughout the world for ex-patients and others to meet together socially and be provided an opportunity for treatment.

### DISCUSSION

In relation to the techniques developed by these five very different hospitals for treating emotional disorders certain principles seem paramount and pertain not directly to the use of social psychiatry in hospital treatment.

Elevation of the Role of the Patient. Respect for the dignity of the patient seems to be the most fundamental idea in the treatment programs of the hospitals we visited. Formerly the patient was regarded as "irresponsible," "dangerous," "psychotic," "neurotic," etc. etc. These terms designate their behavior as unacceptable and serve to isolate them from human contact. Traditional

mental hospitals further isolate patients because of the staff's inability to tolerate their behavior, thus the over use of physical therapy "quiet" rooms, sedation, restraints, and other forms of treatment often lightly disguised as being "for the good of the patient".<sup>11</sup> The patient's behavior is increasingly seen as purposeful and meaningful to him, and the principal task of the staff is first to be able to accept the behavior, no matter to what lengths the patient may go to encourage reprisal, and then to understand what the patient is trying to communicate to others. The symptom of his illness, while serving to isolate him from human society which he sees as distrustful and fearful can thus be used as the first step in his rehabilitation. When this process is understood, it is transmitted to other staff members and to the patients who actually carry out treatment according to their own abilities. It allows for the development of individuality in both patients and staff.

One of the initial impetuses for re-examination of the traditional roles of the staffs of mental hospitals was associated with the acute shortage of trained personnel following World War II. The whole idea of the patient-centered hospital involves the working through of staff anxieties regarding their own acceptance of the patient's socially unacceptable behavior.<sup>12</sup> Only as staff members are able to tolerate the patient's behavior can they feel comfortable enough to allow and encourage the "well part" of the patient to emerge. As staff members are better able to examine their own anxieties, feelings, prejudices, et cetera, toward unacceptable behavior patients become increasingly more responsible for running their own lives. This involves the often tremendously painful task of examining one's own behavior as well as the effectiveness of traditional hospital procedures.

The socialization process begins when the patient is allowed increased participation in the total treatment program by sharing in administrative decision making, as well as helping other patients—and staff. The change over from a more authoritarian atmosphere to one where staff members feel comfortable enough to give up some of the more suppressive elements of their roles is not an easy or smooth adjustment.<sup>13</sup> The hierarchic arrangement which the hospital fosters because of the wide divergence of training and experience of the various staff members must be critically examined when considering the establishment of an environment conducive to co-operation and mutual respect. For this reason, a continual education program is needed whereby new members can become acculturated and older members may continue to grow.<sup>14</sup>

**Communication and Feedback.** There appear to be two main where the patients contribute most to the treatment

the therapeutic community type hospital. These areas we may roughly designate as administration and actual treatment.

Assuming that patients often talk to each other more readily than to the staff it follows that patients often will more easily accept suggestions from other patients than from the staff. It would appear by staff patient communication to the point where the patient feels increasingly comfortable with the staff. Intimate contact between patients in this type of hospital setting often encourages the initial revelation of important and frequently disturbing thoughts and ideas to other patients. In other instances the patient feels comfortable in revealing such material only to staff members. The basic premise in the therapeutic community type of treatment is that both sources of communication will at one point or another be fed back to the entire community or to large segments of it. When the idea of free communication and feedback has been properly developed and used the patient's confidence may bring up the actual content of the material in the group or if he is a more skillful therapist will encourage the patient to appeal to the community for assistance and understanding of his behavior and thus attempt to arrive at acceptable solutions for his difficulty.

Insofar as staff members are able to allow patients to share in decision making the administration of this type of hospital also becomes therapeutic. The appeal to the group conscience becomes an enforcing agent and represents a highly developed type of social control which exercises the authority in a community. The degree of patient participation in administrative and therapeutic endeavors is perhaps most graphically illustrated by the extensive use of alcoholic patients in Warlingham Park Hospital. Here chronic alcoholics are used as therapists for older schizophrenic patients. They are assigned small groups of patients and work with them daily in various activities which they enjoy. As the alcoholic patient becomes increasingly more skillful in dealing with sicker patients he is beginning to regain self confidence and to develop a feeling of accomplishment in the total treatment program. In addition he receives group and individual psychotherapy for his own disorder. In such instances we see developed a more highly refined process of the concept which Stanton and Schwartz<sup>4</sup> have set forth as "administrative therapy".

**Training the Staff** In order to establish and perpetuate the fundamental ideals of a therapeutic community in a hospital setting there must be a means for indoctrination and continual growth of the staff members. By virtue of traditional medical training in a highly structured hierarchy certain aspects of roles and role expectations must be "unlearned". Since much of the suc-

ness of social psychiatric methods depends on the constantly changing nursing staff, a method of education and re education taking into account the staff's own dynamics, needs to be established. At the Social Rehabilitation Unit the use of "tutorials" has been found appropriate to the needs of the program. These are conducted seven days a week by a member of the permanent staff. The turnover of "social therapists" is frequent and their backgrounds varied. Thus their training must include a basic knowledge of people and a minimum of specific nursing techniques. The latter are taught by the nurse only as the situation arises, and the staff member then feels no pressure to be an expert on any phase of nursing. The nurse likewise can request assistance from the hospital proper if a specific nursing situation arises requiring specialized knowledge or techniques. Too often in their relationships with patients, psychiatric nursing personnel feel they must be able to deal with the patients in an unrealistic "therapeutic" manner. As the patient sometimes over identifies with the staff member in a transference situation, role expectations become confused and the staff member feels he must of necessity interpret the patient's behavior in order to help him. This is often coupled with the staff's own need to feel they are helping the patient in an active manner as formerly demanded in their medical training.

When making a transition from a traditional psychiatric hospital structure to a more "egalitarian" organization emphasizing understanding and dealing with interpersonal relations, attitudes of the staff must be closely scrutinized. As Jones and Rappaport<sup>17</sup> have pointed out, much of the treatment procedure stems from the relations between individuals and groups within the institution, and the staff's behavior becomes crucial.

Our former methods of teaching nursing personnel are believed actually to perpetuate social distance between staff and patients, rather than facilitate communication and check distortions. Formal teaching of limited psychiatric material often fosters defensiveness on the part of the staff member and when his need to be "junior psychiatrist" is met rehabilitation of the patient is hindered. The concept of "social therapy" as distinct from "psychotherapy" has important implications. The primary role of the social therapist is one of providing opportunity for the patient to relate to others and to encourage him to feed back his feelings to the community in order that they may understand him and help him. In this way the treatment process is hastened, as he now receives help from all members, consistently and for 24 hours per day. Dangers and pressures of individual psychologic interpretation are lessened, and social relations are fostered.<sup>18</sup>

As all staff members and patients learn to feed back information to the whole community it is possible to arrive at therapeutic goals for each patient—the decisions become community ones and everyone understands the goals and shares in the treatment process. The success of treatment in the relatively short time of hospitalization (e.g., four to six months at the Social Rehabilitation Unit and at the Cassel) for chronic character and behavior disorders and neurotic difficulties is thus understandable as each patient has in a sense many therapists and he too becomes a therapist. More important he is living in a milieu which is consistently therapeutic and treatment as Maxwell Jones expressed it is like being put in a "pressure cooker" to get the patient "well done" in a hurry.

## REFERENCES

- 1 Wilmers H A. Operation breakdown. Personal and Hospital Association 1956
- 2 Wilmers H A. Psychiatry service and psychiatric community. U S Armed Forces J 7 640-654 May 1956
- 3 Wilmers H A. Use and misuse of data and social and medical association. 2 May 1956
- 4 Wilmers H A. Psychiatry service and psychiatric community. 10-month study. N Y 1956
- 5 Jones M. The Therapeutic Community. New York: Brunner/Mazel 1956
- 6 Jones M. Concept of the psychiatric community. Am J Psych 112 647-650 1956
- 7 Skilling E. Therapeutic community. Nurs Times Apr June 1955
- 8 Jones M. Role of the psychiatric community. U S Armed Forces J 7 1465-1469 Oct 1956
- 9 Blum M. T. Dr. Re. Read. Digest 68 115-118 May 1956
- 10 Waddell D. Psychology applied. Eng. Nursing Times Sept 1954 Mar 1955
- 11 Berr J. The Day Hospital. London 1951
- 12 Berr J. Day hospital. J Soc Psych 173 180 Oct 1955
- 13 Cullen Z. Psychiatry and the day hospital. J Soc Psych 173 180 Oct 1955
- 33 41. Autumn 1955
- 14 Tobin A. D. and B. G. D. L. C. N. D. T. I. S. on transition from physical to mental. Unpublished manuscript
- 15 Briggs D. L. and W. D. N. R. Advances in the neurophysiology of the human brain. U S Armed Forces J 7 1615-1620 Nov 1956
- 16 Stetten A. H. and S. H. W. R. T. M. S. The Mental Hospital. A Study of Institutional Psychiatry. New York: Basic Books, Inc. 1956
- 17 Jones M. and R. P. P. R. Abstracts on the day hospital. Unpublished manuscript

# OPERATIVE RESULTS IN LUMBAR 'DISK' SYNDROME

Majority of Patients Return to Full Duty

GAIL G. CLARK *Commander MC USA*

**T**HE EFFECTIVENESS of modern operative therapy of herniated lumbar nucleus pulposus was revealed by review of the cases of 100 unselected consecutive patients who were operated on in this hospital during 1952 to 1955. All of these patients were military personnel on active duty, 77 in the United States Army, 1 in the British Army, and 22 in the United States Marine Corps. All had the same general management post-operatively.

## METHOD OF TREATMENT

Conservative management was tried in all cases for a period of from two to six weeks. This consisted of bed rest on a very firm mattress and analgesics as necessary. Tolserol (brand of meprobamate) was administered when muscle spasm could be identified by palpation or observation of the back in motion, or if roentgenographic studies indicated that the normal lordotic curve was straightened. If the patient showed improvement on this regimen, he was sent to physiotherapy for exercises to regain maximum power in his back and gluteal muscles.

Myelography was performed if there were signs of a single radicular syndrome or if incapacity for work persisted in spite of conservative therapy. It was never done for symptoms alone except in the very rare case where, in spite of absence of radicular signs, the patient insisted that he could not perform his usual duties. In two of five such cases, a myelographic defect consistent with herniation of a nucleus pulposus was observed, and these two patients were operated on.

Myelography was performed preoperatively in all but one of the 100 cases. The reasons for this were twofold. (1) Even though a single radiculitis had been identified by clinical tests and the affected dermatome labeled, there was always the possibility that



a pre or post fixed spinal cord had caused the clinical labeling to be in error by one vertebral level (2) more complete and thorough records were made available for preoperative study to identify the size and extent of the mass pushing on the nerve root

The operative procedure was the popular technic of interlaminar exploration in most cases without removal of bone. Occasionally edges of the lamina above and below the lesion were rongueured away for more adequate exposure. A hemilaminectomy was performed in one case only, this patient had had extrusion and scattered fragmentation of his nucleus pulposus. All operations were performed under general anesthesia.

Postoperative management was considered to be one of the most important elements in the patients treatment. After being operated on in the morning most patients were allowed to get out of bed that same night and attempt to void into a urinal while standing, by the edge of the bed. Every patient was out of bed once on the first postoperative day. All were urged to sit on the side of the bed frequently to dangle their legs and were allowed out of bed for short intervals for the first five postoperative days. Walking was allowed as the patient desired but always for very short periods. Stitches were removed on the seventh postoperative day. After this the patient was transferred to the convalescent ward where he was allowed to take frequent but very short walks and was instructed in exercises designed to achieve the maximum power in the lumbar and gluteal muscles.

Two weeks postoperatively the patient was given 30 days sick leave with strict orders to continue his exercises at home for five minutes of every waking hour. All patients reported by mail after two weeks of their four weeks leave, that they were pursuing this regimen at home. On return from sick leave physiotherapy was increased for a period of 10 days after which the patient was re evaluated.

## RESULTS

The results obtained by the management described may be summarized as follows:

### *Returned to duty (75 per cent)*

The military record will appraise the variety of traumatic duties that were accomplished successfully by carrying the rank and rate of the 37 patients who returned directly to full duty 2 months after operation and of the 18 additional patients who eventually returned to full duty. They were as follows: Air Controller 5, Aviation Mechanic 1, Marine Aviator 1, Electrician 1, Aviation Structural Mechanic 1, Airman Aviator 1, Electrician 1, Technician 1, Boatwain 1, Mate 1, Boilermaker 1, Builder 1, Damage Controller 1, Electrician 1, Marine 2, Engineer 2, Electrician 1, Technician 1, Fireman 1, Photographer 1, Gunner 1, Marine 1, Chief Gunner 1, Hospital Corpsman 1, Inter-Communicator 1, Electrician 1, Machinist 1, Marine 1, Quartermaster 1, Radioman 1, Seaman Apprentice 1, Steward 1, Ship Serviceman 2, Stenographer 1, Seaman 1, Torpedoman 1, Mate 1, Yeoman (WAVE) 1, Marine 1, Private 1, First Class 1, Marine 1, and 14 Navy officers.

57 patients returned to full duty 2 months after operation

16 returned to full duty after 3 to 6 months of limited duty

1 was sent to the Physical Evaluation Board and then returned to full duty

1 was sent to limited duty then to the Physical Evaluation Board and finally returned to full duty

#### *Discharged (25 per cent)*

14 patients were not returned to military duty and were discharged from the military service 3 to 4 months postoperatively

9 were sent to limited duty but after 6 months were not improved enough to return to full duty and were discharged

2 were sent to full duty but were unable to perform their work adequately and were discharged

Of the 14 patients in the group listed above as "not returned to military duty," 8 were sent to the Physical Evaluation Board at their own request, because they desired evaluation at the end of enlistment, prior to discharge from military service. It is believed that some of those men could eventually have been returned to full duty if expiration of enlistment had not prevented their being sent to limited duty for a period and then re-evaluated.

Those patients who were discharged from military service because of disability were estimated by the Physical Evaluation Board, on the basis of symptoms as well as signs alone, to have an average of 30 per cent disability at time of discharge. Of the 25 persons discharged, 1 was rated at 0 per cent disability, 1 at 10 per cent, 10 at 20 per cent, 4 at 30 per cent, 3 at 40 per cent, 5 at 50 per cent, and 1 at 60 per cent.

#### DISCUSSION

The urgency of reporting these cases was brought to my attention when two Chief Hospital Corpsmen were selected for Warrant Officer and there was hesitancy in qualifying them physically for their commission, solely because they had a history of interlaminar explorations for herniation of a lumbar nucleus pulposus. *One had been on full duty for 7 years and another for 5 years.* It is significant that three quarters of the patients herein reported returned to duty, and that in many cases this involved vigorous activity. Two pilots returned to flying planes, and boatswain's mates and motor mechanics returned to their regular work.

The follow up period on these patients ranged from 6 to 28 months. A longer period would be of interest in evaluating long term results, and probably would disclose a few men who were unable to remain on full duty, however, there is a definite need, now, to dispel common and unjustified pessimism toward the results of treatment in this disease. In this group the patients operated on returned to full and

# ORAL LICHEN PLANUS AND LEUKOPLAKIA

## Differential Diagnosis and Treatment

HARRY L. LEVIN *Captain DC USNR*

**A** DEFINITIVE diagnosis of a disease with manifestations in the oral cavity frequently requires a variety of laboratory criteria. Lichen planus (figs 1 and 2) and leukoplakia (figs 3 through 5) are two such diseases. Because the latter is considered to be precancerous it is the responsibility of the dental and oral surgeon to be able to differentiate it from the former.

Lichen planus of the mouth is not an important disease per se as it causes no subjective symptoms and has no serious sequelae. It is of great significance however from a diagnostic standpoint as it is frequently mistaken for leukoplakia, a disease of great importance. It should be emphasized that patches of leukoplakia that have reached the verrucose papillomatous and ulcerated stage or contain hard nodules may be cancerous (squamous cell carcinoma grade one half) and therefore require an adequate biopsy.

In typical cases lichen planus and leukoplakia each present a definite histologic picture,<sup>1</sup> however in clinically atypical cases a corresponding nonspecific histologic picture is frequently observed and a clear cut diagnosis is not always possible. Additional biopsy specimens taken at intervals usually aid in establishing a correct histologic diagnosis.

Lichen planus is characterized by lily-of-the-valley-like or annular markings on the buccal mucosa with definitely outlined round or polygonal pearly white nodules, whitish streaks on the tongue and accompanying lesions on the skin.<sup>2</sup> A biopsy may show a network of bluish white lines known as Wickham's striae. Early lesions usually are erythematous with a violaceous tinge while older ones tend to be darker.<sup>3</sup>

Brocq gave an accurate diagnostic histologic picture of lichen planus and cited a case in which the lesions of this disease and those characteristic of leukoplakia appeared in the mouth at the same time. Darling and Crabo<sup>4</sup> emphasized the oral manifestations of these two diseases; however the mouth lesions associated



*Figure 1 Lichen planus of the buccal mucosa, right side in a male patient of nervous temperament*

with lichen planus are only part of a generalized disease process and are, in effect, skin lesions modified by environment. Nevertheless, the basic pathology and clinical appearance of the skin lesions are relevant to an understanding of the disease in the mouth. Lieberthal<sup>7</sup> described the papules observed in lichen planus, and which may become verrucose. Fox<sup>8</sup> emphasized the importance of differentiating moniliasis from lichen planus as their clinical appearance may simulate one another. With the introduction of the antibiotics, moniliasis of the mouth has become more common than lichen planus. Furthermore, Fox's claims are not in accord with other investigators. Cawley and Kerr<sup>9</sup> and Ormsby and Montgomery<sup>10</sup> described the initial lesions of lichen planus as being bright red in color and later assuming a reddish purple or violaceous hue. With clearing of the eruptions, hyperpigmented macules commonly persist at the site for weeks or months. Cooke<sup>11</sup> described an atrophic form of lichen planus of the mouth, frequently associated with erythematous areas and shallow ulcerations.

The differentiation of lichen planus and leukoplakia of the oral cavity is summarized in table 1.



*Figure 2 Lichen planus of the buccal mucosa left side of a male patient who is a moderate smoker*



*Figure 3 Leukoplakia of the buccal mucosa of a male patient who is a heavy smoker. Note verrucose characteristics of the lesion. (Courtesy of Dr A Budner Lewis and the Rhode Island Hospital)*



Figure 4 Leukoplakia of the buccal mucosa in the mouth of a heavy smoker showing rather extensive advanced plaques with ulcerations indicative of early malignancy (Courtesy of Dr A Budner Lewis and Rhode Island Hospital)



Figure 5 Leukoplakia with ulceration of the oral mucosa in the mouth of a heavy smoker. The lesion may no longer be considered leukoplakia as the lesion is well advanced into the malignant stage (squamous cell carcinoma) (Courtesy of Dr A Budner Lewis and Rhode Island Hospital)

TABLE 1 *Differentiation of lichen planus and leukoplakia of the oral cavity*

	Lichen planus	Leukoplakia <sup>12</sup>
1 Contributory factors	Often associated with nervous tension or instability	Found at sites of irritation (sharp ragged edges of teeth ill fitting dentures et cetera) or of previous irritation such as the site of a former syphilitic gumma Usually associated with poor dental hygiene and excessive smoking
2 Site of lesions	Found as frequently in men as in women  Found on buccal mucosa alveolar ridges dorsum of the tongue and palate May or may not be accompanied by cutaneous lesions Skin lesions when present are most numerous on flexural aspects of forearms and wrists and inner surfaces of thighs and knees There may be alopecia if scalp lesions are present	More common in men than in women  Most common site in the oral cavity May be found on the mucous membrane of the other parts of the body chiefly the vulva
3 Gross morphology	The basic lesion is the violaceous filiform network and meshes of lacework formations on the buccal mucosa appearing as small flat topped angular papules	Usually present as a leathery thickening of the mucosa with a pearly silvery sheen Occurs as lactescent superficial patches of various sizes and shapes which may coalesce to form rather extensive sheets
4 Extension	No adenopathy is present	Lymph nodes usually are not involved until the malignant stage is reached

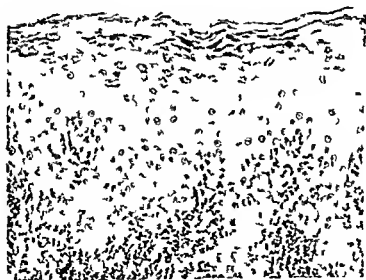
TABLE 1 *Differentiation of lichen planus and leukoplakia of the oral cavity—Continued*

	Lichen planus	Leukoplakia <sup>12</sup>
5 Histopathology	<p>Hyperkeratosis increased thickness of the granular layer which is usually missing in the normal mucous membrane. The cells in the granular layer are coarse and well formed. Several rows of these cells are present. Acanthosis is also present with destruction of the basal layer by the infiltrate from the upper dermis. Lymphocytes are plentiful and invade the stratum Malpighii.</p> <p>The rete ridges on occasion show the "saw tooth papillae which is characteristic" (figs 9-11)</p>	<p>Epithelial horny pearls or cell nests are common. Hyperkeratosis of the superficial layer of the stratum corium with rete ridges in the Malpighian cells undergoing abnormal, premature, or imperfect keratinization resulting in a dyskeratosis (figs 6-8).</p> <p>Neither the hyperkeratosis nor the lymphocytic infiltration is as localized as in lichen planus.</p>
6 Symptoms	<p>May be painful at the onset in the oral cavity. Upon the skin surfaces it becomes very "itchy" and annoying.</p>	<p>Usually not painful until the advanced stages.</p>
7 Terminal picture	<p>After the disease becomes chronic the infiltrate decreases. The plaque like formations develop verrucose tendencies or may disappear spontaneously. Recurrence is common.</p>	<p>Acute leukoplakia may develop rapidly become thickened, actually ulcerate, become papillomatous with verrucose appearance and is more apt to become malignant than the chronic type. Traumatic calluses clear up when source of irritation is removed.</p> <p>One out of every fourth case will develop malignant tendencies—squamous cell carcinoma.</p>





*Figure 6. Leukoplakia. The surface epithelium of oral mucosa showing marked hyperkeratosis. The rete ridges appear somewhat irregular although acanthosis is not excessive. The granular layer is prominent. The basal epithelial cells exhibit hyperchromatism. ( $\times 91$ ) (Courtesy of the Armed Forces Institute of Pathology)*



*Figure 7. Leukoplakia. The surface epithelium shows hyperkeratosis and parakeratosis and irregular acanthosis. Dyskeratosis is evident by the loss of normal maturation of the epithelial cells changes in the size and shapes of the cells and loss of polarity. The basal layer is unbroken and there is no evidence of invasion. The dermis contains a lymphocytic infiltration. ( $\times 146$ ) (Courtesy of the Armed Forces Institute of Pathology)*



Figure 8 Leukoplakia. Moderate dyskeratosis is evident here as characterized by the hyperchromatism and variations in the cell size and shape ( $\times 186$ ) (Courtesy of the Armed Forces Institute of Pathology)



Figure 9 The epithelium in this strip of oral mucosa shows acanthosis with irregular lengthening of the rete ridges. The upper part of the submucosa contains a sharply localized inflammatory cell infiltrate which is in close relation to the basal cell layer. This is consistent with lichen planus ( $\times 58$ ) (Courtesy of the Armed Forces Institute of Pathology)



Figure 10 Parakeratosis shown in greater detail with an orderly maturation of the oral epithelium. There is marked infiltration of plasma and lymphocytes in the upper dermis a condition found in lichen planus. (Courtesy of the Armed Forces Institute of Pathology)



Figure 11 Lichen planus. Characteristic infiltration of plasma cells and lymphocytes in the region of the basal epithelial layer ( $\times 213$ ) (Courtesy of the Armed Forces Institute of Pathology)

## TREATMENT

Treatment of lichen planus is usually unsatisfactory. In former years benefit was claimed in some cases from the administration of arsenic and mercury. Radiation therapy provides no appreciable relief. Radium and ultraviolet rays are equally ineffectual. Cessation of smoking and moderation in the use of condiments are helpful. Gentian violet (methylenedianiline chloride) (1 per cent) is used widely, a 1:1,000 solution of Zephiran Chloride (brand of benzalkonium chloride) and tincture of Merthiolate (brand of thimerosal) have been tried without success. Recently I have used a topical ointment of fludrocortisone acetate (0.25 per cent)\* for treatment of extensions of the dermatologic conditions into the oral cavity, with gratifying results. This material is one of the most potent of the adrenal cortical hormonal agents produced, and it is absorbed readily by the mucous membrane and skin. The use of this ointment in the treatment of other recalcitrant diseases of the oral cavity is definitely indicated. Others<sup>11-13</sup> also reported favorable results in the oral lesions with the topical application of hydrocortisone ointment (2.5 per cent).

Ward<sup>1</sup> called attention to the possible role of vitamins A and C in the cause of leukoplakia. In support of this theory it has been noted that patients treated with large daily doses of vitamin A and C (100,000 units of vitamin A and 500 mg of vitamin C) there is a marked improvement in leukoplakia after a period of from 1 to 3 months. Electrodesiccation and fulguration are usually effective in the early lesions of leukoplakia.

Miller<sup>14</sup> stated that "precancerous lesions are best eradicated by surgery rather than by x-ray or radium since sufficient doses to destroy the lesion will also cause radiodermatitis, which in itself is subject to epitheliomatous degeneration at some later date."

Certain dermatologic diseases have oral manifestations which resist all forms of treatment within the scope of the dental surgeon. Under these conditions the dental surgeon should refer the patient to a capable internist or dermatologist for confirmation of diagnosis and treatment.

## SUMMARY

Lichen planus and leukoplakia present clinical and histologic pictures which require careful diagnostic procedures in establishing a mutually distinctive diagnosis. Treatment of either disease with topical fludrocortisone acetate ointment (0.25 per cent) has produced gratifying results.

\*Fluorone Acetate a brand of fludrocortisone acetate was supplied through the courtesy of Merck Sharp & Dohme Division of Merck & Co. Inc. Philadelphia Pa.

**ACKNOWLEDGMENTS** I wish to thank Dr. Walter F. Lever, Massachusetts General Hospital, and Dr. Lyon P. Strean, Merck Sharp & Dohme Division of Merck & Co., Inc. I also wish to thank Col. Joseph L. Bernier, Armed Forces Institute of Pathology, for his fine photomicrographs.

### REFERENCES

1. Ward, G. E. Leukoplakia. *Bulletin of Progress American Cancer Society* V 13 No. 4 July 1953.
2. Lever, W. F. *Histopathology of the Skin*, 2d edition. J. B. Lippincott Co., Philadelphia, Pa., 1954.
3. Prinz, H., and Grubbaum, S. S. *Diseases of the Mouth and Their Treatment*. L. & F. B. Grubbaum, Philadelphia, Pa., 1935, p. 238.
4. *The Merck Manual of Diagnosis and Therapy*, 8th edition. Merck & Co., Inc., Rahway, N. J., 1950, pp. 1358-1359.
5. Bocq, A. J. L. Lichen planus of mucosa & leukoplakia. *Press. med.*, 27: 277, May 22, 1919.
6. Darling, A. L., and Crabbs, H. S. Lichen planus. *Oral Surg.* 7: 1276-1289, Dec. 1954.
7. Lichtenfeld, D. Lichen planus of the mouth. *J. A. M. A.* 48: 559-562, 1907.
8. Fox, H. (New York). Lichen planus of the mouth. *Arch. Dermat. & Syph.* 24: 1071-1082, Dec. 1931.
9. Cawley, E. P., and K. D. A. Lichen planus. *Oral Surg.* 5: 1069-1076, Oct. 1952.
10. Omsby, O. S., and Montgomery, H. *Diseases of the Skin*, 7th edition. L. & F. B. Grubbaum, Philadelphia, Pa., 1948, pp. 344-357.
11. Cook, B. E. D. Oral manifestation of lichen planus. *Brit. Dent. J.* 7: Jan. 5, 1954.
12. Levin, H. L. P. Lichen planus of the mouth with discussion of differential diagnosis between leukoplakia and lichen planus. *Oral Surg.* 7: 280-286, Mar. 1954.
13. Fisher, A. A. Treatment of lichen planus of the mouth. *New York State J. Med.* 55: 2494-2496, Sep. 1, 1955.
14. Fox, L. M., and Stahl, S. S. Effect of local application of hydrocortisone in the treatment of lichen planus of the mouth. *New York State Dent. J.* 21: 131-134, Mar. 1955.
15. Wolf, H. B. L. R. Lichen planus of the mouth. *Oral Surg.* 7: 314-321, Mar. 1954.
16. Mill, T. R. Cancer of the skin. *Postgrad. Med.* 17: 445-448, June 1955.

# CUTTING CHARACTERISTICS OF DENTAL BURS

As Shown by High Speed Photomicrography

JACK L. HARTLEY Major USAF (DC)  
DONALD C. HUDSON Colonel USAF (DC)  
WILLIAM T. STEFFEN A. B.  
WARREN P. RICHARDSON

**L**ITTLE is known of the cutting action involved in the use of the dental bur for cavity preparation in a human tooth. A better understanding of this mechanism could logically lead to improvement in the design and use of dental rotating cutting instruments. Although considerable information is available on the cutting mechanism of industrial abrasive wheels and milling cutters, this information is not directly applicable to dental instruments because the properties of human tooth enamel and dentin differ greatly from those of other materials. Also, the dental instruments are much smaller than the usual industrial grinding wheels and cutters. The patient's sensitivity to frictional heat, to vibration, and to pain caused by cutting add direct and unique factors to the design of dental burs.

It was believed that certain basic information on the manner of performance of dental burs would be revealed through high speed photography of these instruments as they rotate under load in contact with the test materials human enamel and dentin. The program of high speed photography was, therefore, initiated as part of a continuing study of rotating dental burs.

## EXPERIMENTAL PROCEDURE AND RESULTS

A bur evaluating machine with accessory timing and controlling features, which had been constructed at the United States Air Force School of Aviation Medicine, Randolph Field, Tex., and

---

This report concerns part of the dental research program conducted at the National Bureau of Standards in co-operation with the Council on Dental Research of the American Dental Association, the Army and Navy Dental Corps, the Air Force Dental Service, and the Veterans Administration. Mr. Sweeney is Chief of the Dental Research Section in which Colonel Hudson and Major Hartley were Guest Workers. Mr. Richardson is Chief of the Photographic Services Section.

Col. Hudson and Maj. Hartley are now assigned to the School of Aviation Medicine, Randolph Air Force Base, Tex.

shipped to the National Bureau of Standards was modified to permit placement of cameras above the specimen. In preliminary investigations high speed still photographs were made employing a flash unit which emitted an intense light two millionths of a second in duration. This light effectively stopped the action of a dental bur in rotation. The light was focused by means of a condensing lens system which increased the illumination by concentrating the light on the bur head. Four by five inch film rated at a speed of ASA 64 Tungsten (American Standards Association exposure index) was exposed by the open flash method in a standard laboratory camera. The lens opening was  $f/5$ . Magnification was approximately 10 diameters.

A number 559 tungsten carbide bur was photographed cutting a glass microscope slide. The load was 300 grams and the speed of rotation was 5 000 revolutions per minute (r p m) (fig 1). Interpretation of the photograph indicated that a pulverizing action rather than a true chip formation had taken place. The powdered glass debris accumulated on the entrant side of the excavation. This phenomenon is a possible explanation for clogging of the bur in that the debris was not thrown out at the exit side but was carried around to the entrant side of the excavation where it was occasionally picked up and carried back through the cut. Heat dissipation was hindered by the accumulation of debris at this point which may be an explanation for chipping which occurs at the entrant side.

Another number 559 tungsten carbide bur rotating at 5 000 r p m cutting a cast resin under a 200 gram load was photographed by the same method. This material was used in previous work as a substitute for dentin. True chip formation can be seen in the photograph (fig 2). This should be expected when a milling type cutter is employed in its proper medium. The chips are accumulated on the exit side of the excavation probably because they are too large to be carried around by the vortex of air created by the revolving bur.

These still photographs were of some value and served to stimulate interest in observing the instruments photographically under dynamic conditions. The single exposure high speed flash method of photographing a rotating dental bur did not permit sequential studies of the cutting action on any particular blade.

A 16 mm high speed motion picture camera which operated at a speed of 3 000 frames per second (f p s) was first used in obtaining slow motion studies of dental burs. Adequate magnification of the small dental burs required the use of an  $f/40$  six inch telephoto lens with a two diopter supplementary lens and an extension tube eight inches in length. The camera was mounted on a heavy tripod directly over the precision chuck of the bur evaluating machine. Exposure, at the rate of 3 000 f p s was



Figure 1 A 2 microsecond flash photograph. Direction of rotation is counter clockwise as viewed by the reader. Carbide bur cutting glass. 5 000 r p m. 300 gram load. (Bur diameter approximately 0.05 in.)

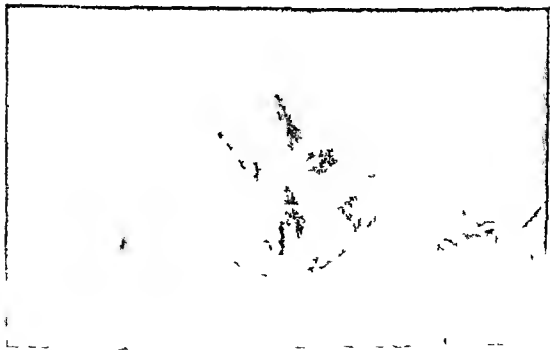


Figure 2 A 2 microsecond flash photograph. Direction of rotation is counter clockwise as viewed by the reader. Carbide bur cutting a dentin substitute (Bakelite cast resin) 5 000 r p m. 200 gram load. (Bur diameter approximately 0.05 in.)



1/15,000th of a second per frame. This extremely short exposure, combined with the reduction in effective aperture of the lens due to the extension tubes,\* required a high intensity light source. Eleven 750 watt focusing photoflood bulbs were arranged in a circle above the subject. An internally chrome plated ring placed around the chuck aided in concentrating light on the bur head.

Reversal type 16 mm motion picture film rated at ASA 64 Tungsten was used when motion pictures were made for projection. Negative film with the same characteristics was employed when single frame enlargements were required. A 100 foot roll of film required but 1.25 seconds for exposure at 3,000 f.p.s. The action recorded on the film in this period was extended to approximately three minutes by projection at the normal speed of 24 f.p.s. With the addition to the equipment of two other cameras capable of speeds of 7,000 and 14,000 f.p.s. the three cameras effectively slowed the action of burs rotating at 2,500, 5,000 and 10,000 r.p.m. respectively. These speeds correspond approximately to low, average, and high rotational speeds for operating dental hand pieces.

Additional illumination was required for the faster cameras since the exposure was only 1/35,000th of a second for the 7,000 f.p.s. camera and 1/70,000th of a second for the 14,000 f.p.s. camera. Four 1,000 watt spotlights that contained parabolic reflectors were used. Their light was further concentrated by means of 2x condensing lenses four inches in diameter (fig. 3). A foot candle meter reading indicated over 300,000 foot candles of light was available in an area of two square inches around the specimen. The short interval of time involved in turning on the lights energizing the camera and turning off the lights minimized damage to the specimen or equipment from heat.

The most effective studies of the burs rotating in slow motion were accomplished by observing the projected motion pictures.\*\* Some information can be obtained from prints enlarged from individual frames of the motion picture film although such prints do not show details clearly (fig. 4). A complete rotation cycle of a bur turning at 2,500 r.p.m. and photographed at 3,000 f.p.s. could be observed in approximately 74 frames. Every fourth frame from a typical rotation cycle was enlarged and printed. Six key pictures were chosen from such a print series for figure 4.

---

The formula  $EA = \frac{V}{F}$  applies. Where EA = effective aperture, V = lens film distance, f = marked lens aperture and F = focal length in inches.

A 16-mm sound film running approximately 15 minutes and showing some of the burs studied in this work may be obtained on loan by writing the Office of Technical Information, National Bureau of Standards, Washington 25, D. C.

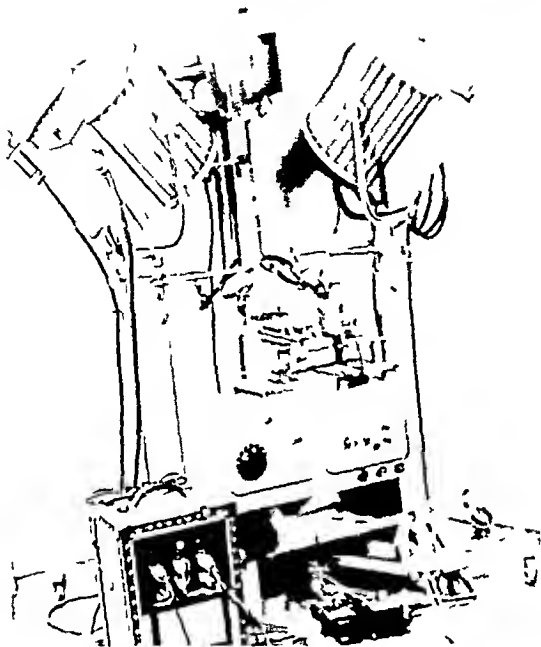
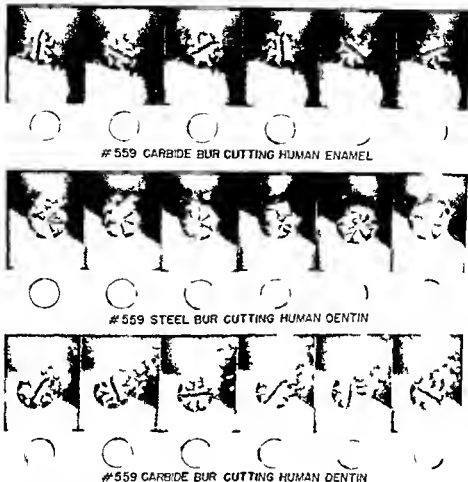


Figure 3 High-speed motion-picture camera and auxiliary equipment for slow-motion photography of rotating dental burs. Below the camera is the bur-evaluating machine the camera control unit is at lower left

The top row of pictures in figure 4 shows the sequence of events from left to right as a number 559 eight bladed tungsten carbide bur cuts human enamel at 2,500 rpm with a 300 gram load. This bur was 0.003 of an inch eccentric as measured by total runout. It can be seen that only four blades were actually cutting, and that in one phase of its rotation the bur was not in contact with the tooth structure. Some of the debris, finely powdered, followed the vortex of air about the bur and was carried back into the excavation. The bulk of the cut material was deposited at the exit side, where it is seen to have accumulated. Very little cutting was evident. The debris created by the steel



THE INSTRUMENTS ABOVE WERE ROTATING AT A SPEED OF 2 500 RPM AT A LOAD OF 300 GRAMS

*Figure 4 High-speed motion-picture 16-mm frames enlarged to show stages in the rotation cycle of typical dental bur (Bur diameter approximately 0.05 in.)*

bur while cutting enamel was so finely powdered that it was barely visible

A number 559 six bladed steel bur cutting human dentin was photographed at 3 000 f p s The load was 300 grams speed 2 500 r p m The key pictures from a cycle of rotation (fig 4 middle row) show definite chip formation although the chips are fragmented and tend to follow the instrument as it rotates Bounce due to eccentricity is not visible however a study of the debris reveals that the cutting was intermittent The bottom row of pictures in figure 4 illustrates the cutting cycle of a number 559 tungsten carbide bur in dentin The chip formation is superior to that seen in the case of a steel bur cutting the same material

The first photograph in the series shows the bur in a phase of its cycle of rotation, in which a great amount of dentin has been removed and is leaving the excavation. The blades in cutting position at this stage are ineffective since the instrument is 0.003 of an inch out of round, or eccentric. The fourth photograph in this series shows the bur after rotation of 150 degrees, it can be seen that the blades now in the excavation are cutting effectively. This intermittent cutting action was observed in all eccentric burs studied. Increasing the load to 500 grams accentuated the intermittent action.

In the slow motion pictures obtained in this investigation chip formation is revealed in detail as the individual bur blades pass through the excavation. The manner of operation of various types of bur blade designs can be readily studied as the bur appears to rotate slowly. For example, a chip that is formed by one type of bur blade may be seen to break away from the parent substance, strike the blade ahead, and cause chipping. Fine comminuted chips created by a bur that is rotating at too low a speed (2,500 r.p.m. in this case) and thus cutting ineffectively, are seen to follow the vortex of air about the revolving bur. At 5,000 r.p.m. this condition was not improved. At 10,000 r.p.m. a definite improvement in clearance of debris is noted. The effect of improper design is readily seen in some carbide burs, which are observed to cut very poorly even though they do not dull.

It is believed that the superior workmanship of carbide burs in general, noted on comparative microscopic examination of steel and carbide instruments, is a factor affecting the cutting ability of the two types. Curled edges, seen on the steel bur (fig. 5) rapidly dull and break. Rounded edges of the cross cut areas

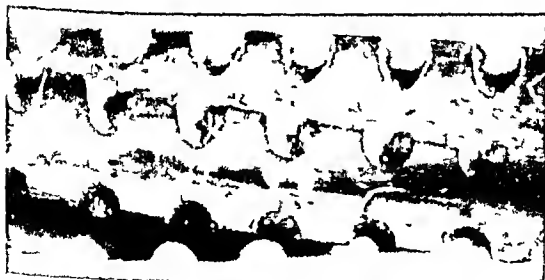


Figure 5 New unused steel bur. Note the curled and drawn edges. (Bur diameter approximately 0.05 in.)

created during the machining of the bur may cause clogging. These conditions were not seen on the carbide burs examined (fig 6). The extreme hardness of tungsten carbide permits burs of this material to cut hard substances with less dulling of the



*Figure 6. New unused carbide bur. Note the clean-cut edges and lack of dulling surfaces. (Bur diameter approximately 0.05 in.)*

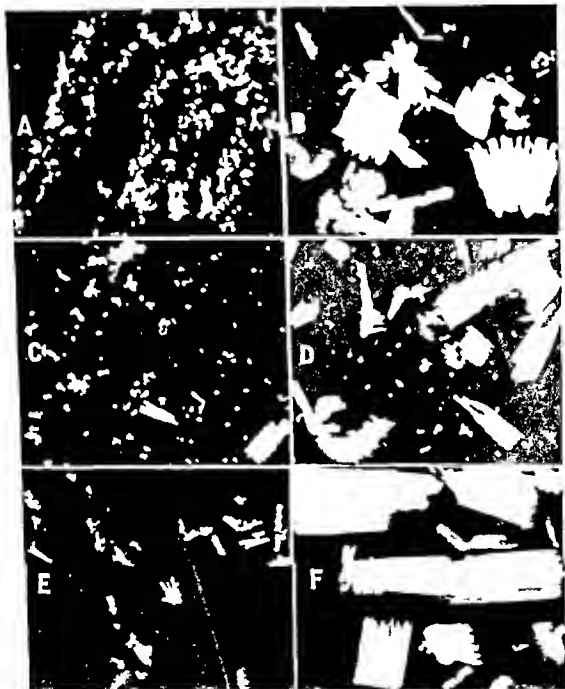
blade edges which present a clean, well machined appearance. However, neither steel nor carbide burs which are designed as milling type cutters, appear to operate efficiently in a material as hard as human enamel. No true chips are seen to form as these instruments cut tooth enamel. Photomicrographs of typical samples of debris from enamel and dentin produced by steel and carbide burs are shown in figure 7. The great difference between enamel and dentin chips is evident. However, no consistent difference is seen between the chips produced by steel and those produced by carbide instruments. Chips produced in dentin by carbide bur brand X are somewhat larger than those from carbide bur brand Y.

### CONCLUSIONS

High speed motion picture photography of dental burs under actual cutting conditions permits detailed slow motion study of the action of each bur blade throughout the cycle of rotation.

In enamel, neither steel nor carbide instruments produced true chips, as would be expected from a milling type cutter. Both steel and carbide burs produced true chip formation and were more efficient in dentin than in enamel.

These photographic studies, when combined with the conventional laboratory testing methods, provide a new and more complete approach to the study and design improvement of rotating dental cutting instruments.



*Figure 7 Dentin and enamel chips produced by new number 358 burs rotating at 5 000 r p m. under a load of 200 grams. (A) Steel bur in enamel (B) Steel bur in dentin. (C) Carbide bur brand X in enamel (D) Carbide bur brand X in dentin. (E) Carbide bur brand Y in enamel (F) Carbide bur brand Y in dentin. ( $\times 51\frac{1}{2}$ )*

#### SUMMARY

High speed still and motion picture photomicrography has been used in the study of the mechanism of cutting of dental burs. Two microsecond flash still photographs were made of dental burs cutting glass and cast resin at 5,000 r p m with a load of 300 grams. Slow motion studies employing high speed motion

picture cameras at 3 000 7 000 and 14 000 f p s were made of steel and carbide burs running at 2 500 5 000 and 10 000 r p m with a load of 300 to 500 grams the materials cut were human enamel dentin and test substitutes for tooth structure The action occurring within a second was extended to approximately three minutes for study by projection at 24 f p s These methods permitted observations of clogging intermittent cutting and eccentric rotation

#### REFERENCE

1 Had on D C and Sw ency W T Temper tur d loped n rotati g d stal  
 cutting s trum nt J Am Dent A 48: 127 133 F b, 1954

#### NATURE TAKES ITS COURSE

Everyone survives all illnesses except his last often uninfluenced by medical care not infrequently hindered by medical care sometimes decisively helped by it That is the cold unpalatable truth Fortunately lay people have little appreciation of this and I cannot say that we make any great effort to enlighten them This element of deception may be in the patient's best interests and is not inherently unscientific or immoral but scientific apostasy sets in when we ourselves fail to recognize when we have only played a passive role It is often hard for us to realize that the peptic ulcer has healed spontaneously without aid from our dietetic regime of food and sago We readily ignore the fact that the good season the hay-fever patient has enjoyed after our course of pollen inoculations is due to the weather We readily believe that our series of recoveries from myocardial infarction is due partly at least to our regime of strict bed rest

—W MELVILLE ARNOTT M D

in *Lancet* p 783 Oct 15 1955

# SURGICAL TREATMENT OF PLANTAR CORNS

BEN A. RUTLEDGE *Lieutenant Colonel MC USA*

ALVIN L. GRIFFIN *Specialist third class USA*

**C**ORNS occurring inferior to the metatarsal heads are often a major disability, especially for persons whose occupations demand long hours of weight bearing. Although these growths occasionally are asymptomatic, symptoms usually vary from slight discomfort to inability to bear weight. The incidence is fairly high, and intractable corns frequently receive only minimal and ineffective treatment.

A plantar corn (clavus) tends to lie directly beneath a weight-bearing bony prominence. It is often mistaken for a plantar wart (verruca). When in doubt as to the correct diagnosis, removal of the superficial layers will disclose the true nature of the lesion. A wart is characterized by elongated dermal papillae with enlarged blood vessels, is sharply demarcated by a wall of fibrous tissue, and is tender even on side-to-side pressure. A corn presents a horny, conical core of closely packed epidermal cells arranged in concentric layers, and is primarily painful only on direct pressure. Climatic changes seem to intensify the pain. A possible explanation for this is that the keratinized material contained in a corn, which is hygroscopic, tends to become swollen when the air is moist.

## TYPES OF TREATMENT

The literature contains a multitude of reports concerning treatment of plantar warts, whereas only a few reports concern treatment of plantar corns. Many authors erroneously use the term plantar wart in reference to any plantar excrecence, and we believe that the "plantar warts" referred to in many articles are in actuality corns.

The surgical treatments reported vary from simple removal of the corn to more radical procedures such as local excision requiring skin grafting, and plastic operations as described by Ghormley and Lipscomb,<sup>1</sup> Haggart,<sup>2</sup> and Blair, Brown, and Byars.<sup>3</sup> Condylectomy, to remove the cause of a plantar corn by removing the underlying bony prominence, was described by DuVries.<sup>4</sup> A more radical procedure reported by Dickson<sup>5</sup> consists of "removal



of a V shaped section of the foot including a wide excision of the wart with the corresponding toe and metatarsal " key" advocated removal of the metatarsal head

There is no question that treatment of an intractable plantar corn should be directed toward removal of the cause : e the underlying bony prominence

This article reports a method of surgical treatment for such corns occurring beneath the 2d 3d or 4th metatarsal heads of the foot No originality is claimed We believe that removal of the metatarsal head and at least one third of the shaft is an adequate procedure for treatment of intractable corns in these areas Figure 1 illustrates the amount of bone removed Thirty plantar corns have been treated by this method The immediate postoperative period for all patients has been excellent however our longest follow up is 18 months



Figure 1 Roentgenogram showing amount of bone removed.

## OPERATIVE PROCEDURE

A short dorsal longitudinal incision is made over the offending metatarsal head. The extensor tendons are retracted, the periosteum reflected, and the metatarsal is cut with a bone cutter through the junction of the middle and distal one third of the shaft. The metatarsal head and distal shaft are excised by sharp dissection, and the roughened portion of the distal end of the shaft is rounded and rasped. No postoperative treatment is given, other than bed rest and elevation of the foot for three to four days.

Most of our patients were able to walk by the fifth day and were relieved of pain from the corn immediately. Service personnel returned to duty in three weeks, on the average. The corns disappeared about the eighth postoperative week. As a group, these patients were notably grateful for the immediate relief obtained.

This procedure leaves no scar on the weight bearing surface of the foot. The toe recedes one eighth to one fourth of an inch (cosmetically this is hardly noticeable), and the toe still functions. Formation of new corns on adjacent metatarsal heads thus far has not been observed. A five year follow up is planned.

## SUMMARY

Plantar corns that are intractable to conservative management should be treated by removing the underlying bony prominence. Good results have been observed in 30 cases in which the offending metatarsal head and about one third of the shaft were removed according to a simple technique that is described.

## REFERENCES

1. Ghormley, R. A. and Lipscomb, P. R. Use of untubed pedicle grafts in repair of deep defects of foot and ankle: technique and results. *J Bone & Joint Surg.* 26: 483-488, July 1944.
2. Haggart, G. E. Conservative and surgical treatment of plantar warts. *S. Clin. North America* 14: 1211-1218, Oct. 1934.
3. Blair, V. P., Brown, J. B. and Byars, L. T. Plantar warts: flaps and grafts. *J. A. M. A.* 108: 24-27, Jan. 2, 1937.
4. QuVries, H. L. New approach to treatment of intractable verruca plantaris (plantar wart). *J. A. M. A.* 152: 1202-1203, July 25, 1953.
5. Oickson, J. A. Surgical treatment of intractable plantar warts. *J Bone & Joint Surg.* 30-A: 757-760, July 1948.
6. Key, J. A. Discussion, in reference 5.

of a V shaped section of the foot including a wide excision of the wart with the corresponding toe and metatarsal "key" advocated removal of the metatarsal head

There is no question that treatment of an intractable plantar corn should be directed toward removal of the cause : e the underlying bony prominence

This article reports a method of surgical treatment for such corns occurring beneath the 2d 3d or 4th metatarsal heads of the foot No originality is claimed We believe that removal of the metatarsal head and at least one third of the shaft is an adequate procedure for treatment of intractable corns in these areas Figure 1 illustrates the amount of bone removed Thirty plantar corns have been treated by this method The immediate postoperative period for all patients has been excellent however our longest follow up is 18 months



Figure 1 Roentgenogram showing amount of bone removed.

# PLANTAR CORNS OPERATIVE PROCEDURE

221

A short dorsal longitudinal incision is made over the offending metatarsal head. The extensor tendons are retracted, the periosteum reflected, and the metatarsal is cut with a bone cutter through the junction of the middle and distal one third of the shaft. The metatarsal head and distal shaft are excised by sharp dissection, and the roughened portion of the distal end of the shaft is rounded and rasped. No postoperative treatment is given, other than bed rest and elevation of the foot for three to four days.

Most of our patients were able to walk by the fifth day and were relieved of pain from the corn immediately. Service personnel returned to duty in three weeks, on the average. The corns disappeared about the eighth postoperative week. As a group, these patients were notably grateful for the immediate relief obtained.

This procedure leaves no scar on the weight bearing surface of the foot. The toe recedes one eighth to one fourth of an inch (cosmetically this is hardly noticeable), and the toe still functions. Formation of new corns on adjacent metatarsal heads thus far has not been observed. A five year follow up is planned.

## SUMMARY

Plantar corns that are intractable to conservative management should be treated by removing the underlying bony prominence. Good results have been observed in 30 cases in which the offending metatarsal head and about one third of the shaft were removed according to a simple technique that is described.

## REFERENCES

- 1 Ghormley R A and Lipscomb P R Use of untubed pedicle grafts in repair of deep defects of foot and ankle technique and results *J Bone & Joint Surg* 26: 483-488 July 1944
- 2 Haggart G E Conservative and surgical treatment of plantar warts *S. Clin North America* 14: 1211-1218 Oct 1934
- 3 Blair V P Brown J B and Byars L T Plantar warts flaps and grafts *J A M A* 108: 24-27 Jan 2 1937
- 4 Ouwries H L New approach to treatment of intractable verruca plantaris (plantar wart) *J A M A* 152: 1202-1203 July 25 1953
- 5 Olickson J A Surgical treatment of intractable plantar warts *J Bone & Joint Surg* 30 A: 757-760 July 1948
- 6 Key J A Discussion In reference 5



## Clinicopathologic Conference

3415th U S Air Force Hospital Lowry Air Force Base Denver Colo

### CENTRAL NERVOUS SYSTEM BLEEDING AND SPLENOMEGALY

**Summary of Clinical History** A 35 year-old white man was admitted to the hospital on 9 April 1956. He was unable to give a good history and most of the history was therefore obtained from his friends and relatives. For about two weeks prior to admission to the hospital the patient had had a staggering gait, vertigo, and troubles of intellect. On the morning of admission he had great difficulty in walking with a tendency to fall to the left. The same day he also became nauseated and vomited. According to his mother and sister the patient had had abdominal pains for the last three or four years. His appetite had been extremely poor for about one year and he had eaten mainly canned food.

**Military history** revealed that the patient had spent about one year in Korea, returning to the United States two years ago. He spent four years in Germany (from 1948 to 1952). He was an instructor in weapons. He never indulged in alcohol.

**Physical Examination** On admission the patient appeared normally developed but chronically ill. The blood pressure was 120/70 mm Hg, pulse rate 100 per minute, respirations 20 per minute, temperature 98°F. On examination of the eyes, nystagmus was noted on lateral gaze. Pupils, fundi, and vision fields were normal. Ears, nose, and throat were negative and there was no nuchal rigidity. The heart and lungs were normal. Examination of the abdomen revealed a palpable spleen 4 cm beneath the left

---

Col. Lev M. Bruns, USAF (MC), Commanding Officer, Fomth Medical Ad Lbrary Serv c. Capt. Charles R. Frick, USAF (MC), Chief Medical Serv c. Capt. Bernard C. R. Bulky, USAF (MC), Chief Laboratory Serv c.

costal margin. It was smooth, firm, and nontender. The liver was not palpable, and there was no abdominal tenderness. Gonitain and rectum were normal. Examination of the skin revealed sparse hair distribution. One spider angioma was noted on the back of the neck. There was no icterus. No lymph nodes could be palpated. Examination of the extremities revealed clubbing of the fingers, and there was slight pitting edema of the legs. Brownish discoloration was noted on the lower parts of both legs. Neurologic examination revealed slurring of speech and marked incoordination. Romberg sign was positive with the eyes open, and the patient had a tendency to fall to the left. The gait was extremely unsteady, also with a tendency to fall to the left. There was no muscular weakness. All the reflexes were hyperactive but equal. No pathologic reflexes could be obtained.

**Laboratory Studies.** Serologic examination was negative. Roentgenograms of the chest and skull were reported normal. A flat abdominal roentgenogram revealed an enlarged spleen. Blood tests showed a white blood cell count of 4,500/ $\mu$ l with a differential of 60 per cent neutrophils and 40 per cent lymphocytes. Hemoglobin was 9 g/100 ml, red blood cells, 2,810,000/ $\mu$ l, hematocrit, 32 ml/100 ml, corrected sedimentation rate (Wintrobe), 22 mm, platelet count, 37,200. The red blood cells were reported as macrocytic. Coombs' test was negative. Bone marrow aspiration showed erythroid hyperplasia, with a myeloid erythroid ratio of 1:1.5. No megakaryocytes were seen. A spinal tap was performed, the fluid was xanthochromic, otherwise not abnormal. Liver function tests showed a cephalin cholesterol flocculation of 4+, thymol turbidity of 7.1, total proteins, 5.4 g/100 ml (2.5 g/100 ml albumin, and 2.9 g/100 ml globulin) (A/G ratio 0.86). The total bilirubin was 0.9 mg/100 ml, with a direct bilirubin of 0.35 mg/100 ml. Prothrombin time was 75 per cent of normal. Blood urea nitrogen was 15 mg/100 ml. A routine urinalysis was negative. The amount of urobilinogen in the urine was normal, the urine was negative for bilirubin. The urine turned black on standing, and examination for porphyrins by the Watson test was positive.

**Course in Hospital.** The patient was placed on bed rest and treated for nausea and vomiting. His course was downhill. Headache, slurring of speech, and increased irrational behavior were present. On 13 April the patient became comatose. At this time all his extremities were flaccid. Reflexes remained hyperactive, with a sustained ankle clonus and a positive Babinski bilaterally. Severe nuchal rigidity was present. A repeat spinal tap was again xanthochromic. The patient was given blood transfusions, Metacorten (brand of prednisone), and Terramycin (brand of oxytetracycline hydrochloride). His condition continued to deteriorate, and he began to have convulsive episodes with spasm of the

glottis and difficulty with respiration. An airway was put in place and he was placed in an oxygen tent. The patient died on 14 April 1956 at 1455 hours.

### DISCUSSION

Doctor Schneck \*I think we can begin by first looking at the only x ray of any significance this simply shows an enlarged spleen which was palpable in the initial physical examination and through the hospital course. This man was 35 years old which is significant because that is fairly young to have a fatal illness of the character that his apparently was. He came in on 9 April and was unable to give a good history. There could be several reasons for this inability to speak coma thickness of speech confusion or many others. I saw this man one night two days before he died and from my observation would presume that confusion was the main reason for his not being able to give a good history. Most of the history was obtained from friends and relatives who observed staggering gait vertigo and troubles of intellect in the patient for about a two week period before he came in. Now you can pin these symptoms on many things in the central nervous system and I prefer to wait a few minutes before I tell you what I believe they are from. On the morning of admission they noticed he had difficulty in walking and fell to the left. He also became nauseated vomited and then came to the hospital. Past history as given is very brief abdominal pains for the last three or four years. There is no description of character location et cetera so that one has to speculate about these. He had had a poor appetite for a year and had eaten mainly canned food. He had been overseas in Korea for awhile and then in Germany. Then there is the significant statement that he had not indulged in alcohol.

Now it seems to me that this man had some sort of liver disease tied up with spleen involvement and hematologic disorders. The first question is does he have cirrhosis? Well he is 35 which is young for cirrhosis. Generally the age according to Cecil and Loeb<sup>1</sup> is from 45 to 65. There are many causes of cirrhosis and diagnostic tables give between 8 and 12 causes. Laennec's cirrhosis which is the most common can be caused by many things among them toxins such as carbon tetrachloride and phosphorus. Alcohol is implicated in only about 50 per cent and less than 10 per cent have a history of hepatitis. Usually however there is no known cause. It is true that in the Orient malaria and other enteric diseases will give a Laennec type of cirrhosis but there is no history that he developed any of this in Korea. There are endocrine changes which occur in Laennec's cirrhosis resulting in a sparseness of hair and sometimes gynecomastia and testicular atrophy. The reason presumably is that the liver cannot detoxify circulating estrogens or at least does so imperfectly.

It is interesting that the signs initially can be very vague and can last for several years. Nausea, vomiting, and vague abdominal pain are very common. There is often a low grade fever. This man incidentally did not have fever. There is often vomiting, there is weight loss. Jaundice is seldom a conspicuous feature in Laennec's cirrhosis. The bilirubin while it may be slightly elevated is often quite normal in many patients until they go into complete liver failure. Two thirds of the patients with Laennec's cirrhosis have a spider angioma which this individual had on the back of his neck. Some have scanty body hair and ascites while it occurs, is not very common until the disease is fairly advanced. If you can feel the liver and you can feel it in only about half of the cases it feels knobby and is tender. In one series the spleen was palpable in 55 out of 124 cases, and the splenomegaly is due to portal obstruction. Clubbing of the fingers also can occur in cirrhosis. It is not common and is seen in possibly 15 per cent of the cases. Bleeding is a considerable problem and very common in cirrhosis. But it is almost always bleeding from the gastrointestinal tract—either hematemesis or melena—and probably due to the portal hypertension that develops. It also is due to decreased prothrombin, fibrinogen and globulin all of which are made in the liver. The flocculation and thymol turbidity tests are usually positive. There is a decrease in albumin and an increase in globulin and a persistent decrease in albumin is taken as a bad prognostic sign. There is also a macrocytic anemia. You do not necessarily get urobilinogen or bilirubin in urine in cirrhosis, and this patient did not have it.

Briefly to mention other causes of cirrhosis there is postnecrotic cirrhosis which, as you know follows hepatitis perhaps 5 per cent of all cases of cirrhosis are of this type. I do not think this man had a postnecrotic cirrhosis because he had no history of having hepatitis, although it is a possibility that he could have had an anicteric hepatitis. These people when sick are usually quite jaundiced however, and I think this would rule it out. Also they frequently have recurrent attacks of hepatitis which this patient did not have. There is the cirrhosis of hemochromatosis. Seventy five or 80 per cent of these people have diabetes and are between the ages of 40 to 60 years. There is biliary cirrhosis. Generally these people are quite jaundiced, and I believe this rules out this type. There is a cirrhosis due to syphilis, he had a negative serologic test. There is a cirrhosis due to parasites, such as *Schistosoma* he was in Korea and so it is a possibility. I do not think it is too likely however because he did not have fever, chills or signs of an acute infection which is usually found in a parasitic type of cirrhosis. There is the cirrhosis of hepatolenticular degeneration or Wilson's disease. There is finally a cirrhosis which is possible on the basis of cardiac disease he had no history of cardiac disease.

To get back to our patient I think it is quite likely that he had a cirrhotic liver. I do not know the specific cause and I will simply



glottis and difficulty with respiration. An airway was put in place and he was placed in an oxygen tent. The patient died on 14 April 1956 at 1455 hours.

### DISCUSSION

Docto Schneck. I think we can begin by first looking at the only x ray of any significance. This simply shows an enlarged spleen which was palpable in the initial physical examination and through the hospital course. This man was 35 years old which is significant because that is fairly young to have a fatal illness of the character that his apparently was. He came in on 9 April and was unable to give a good history. There could be several reasons for this inability to speak: coma, thickening of speech, confusion, or many others. I saw this man one night two days before he died and from my observation would presume that confusion was the main reason for his not being able to give a good history. Most of the history was obtained from friends and relatives who observed staggering gait, vertigo, and troubles of intellect in the patient for about a two week period before he came in. Now you can pin these symptoms on many things in the central nervous system and I prefer to wait a few minutes before I tell you what I believe they are from. On the morning of admission they noticed he had difficulty in walking and fell to the left. He also became nauseated, vomited, and then came to the hospital. Past history as given is very brief: abdominal pains for the last three or four years. There is no description of character, location, et cetera, so that one has to speculate about these. He had had a poor appetite for a year and had eaten mainly canned food. He had been overseas in Korea for awhile and then in Germany. Then there is the significant statement that he had not indulged in alcohol.

Now it seems to me that this man had some sort of liver disease tied up with spleen involvement and hematologic disorders. The first question is: does he have cirrhosis? Well, he is 35, which is young for cirrhosis. Generally the age, according to Cecil and Loeb,<sup>4</sup> is from 45 to 65. There are many causes of cirrhosis and diagnostic tables give between 8 and 12 causes. Laennec's cirrhosis, which is the most common, can be caused by many things among them toxins such as carbon tetrachloride and phosphorus. Alcohol is implicated in only about 50 per cent and less than 10 per cent have a history of hepatitis. Usually, however, there is no known cause. It is true that in the Orient malaria and other enteric diseases will give a Laennec type of cirrhosis, but there is no history that he developed any of this in Korea. There are endocrine changes which occur in Laennec's cirrhosis, resulting in a sparseness of hair and sometimes gynecomastia and testicular atrophy. The reason presumably is that the liver cannot detoxify circulating estrogens or at least does so imperfectly.

It is interesting that the signs initially can be very vague and can last for several years. Nausea, vomiting, and vague abdominal pain are very common. There is often a low grade fever. This man incidentally, did not have fever. There is often vomiting, there is weight loss. Jaundice is seldom a conspicuous feature in Laennec's cirrhosis. The bilirubin while it may be slightly elevated is often quite normal in many patients until they go into complete liver failure. Two thirds of the patients with Laennec's cirrhosis have a spider angioma, which this individual had on the back of his neck. Some have scanty body hair and ascites while it occurs, is not very common until the disease is fairly advanced. If you can feel the liver and you can feel it in only about half of the cases it feels knobby and is tender. In one series the spleen was palpable in 55 out of 124 cases and the splenomegaly is due to portal obstruction. Clubbing of the fingers also can occur in cirrhosis. It is not common and is seen in possibly 15 per cent of the cases. Bleeding is a considerable problem and very common in cirrhosis. But it is almost always bleeding from the gastrointestinal tract—either hematemesis or melena—and probably due to the portal hypertension that develops. It also is due to decreased prothrombin, fibrinogen and globulin, all of which are made in the liver. The flocculation and thymol turbidity tests are usually positive. There is a decrease in albumin and an increase in globulin and a persistent decrease in albumin is taken as a bad prognostic sign. There is also a macrocytic anemia. You do not necessarily get urobilinogen or bilirubin in urine in cirrhosis and this patient did not have it.

Briefly to mention other causes of cirrhosis there is postnecrotic cirrhosis which, as you know, follows hepatitis, perhaps 5 per cent of all cases of cirrhosis are of this type. I do not think this man had a postnecrotic cirrhosis because he had no history of having hepatitis, although it is a possibility that he could have had an anicteric hepatitis. These people when sick are usually quite jaundiced however, and I think this would rule it out. Also they frequently have recurrent attacks of hepatitis which this patient did not have. There is the cirrhosis of hemochromatosis. Seventy five or 80 per cent of these people have diabetes and are between the ages of 40 to 60 years. There is biliary cirrhosis. Generally these people are quite jaundiced and I believe this rules out this type. There is a cirrhosis due to syphilis he had a negative serologic test. There is a cirrhosis due to parasites such as *Schistosoma* he was in Korea and so it is a possibility. I do not think it is too likely however because he did not have fever, chills or signs of an acute infection which is usually found in a parasitic type of cirrhosis. There is the cirrhosis of hepatolenticular degeneration or Wilson's disease. There is finally a cirrhosis which is possible on the basis of cardiac disease he had no cardiac disease.

To get back to our patient I think it is quite a cirrhotic liver. I do not know the specific cause.

in 300 cerebrovascular accidents How common is cerebellar artery occlusion? Not too common but there are usually characteristic symptoms There are three main arteries that go to the cerebellum the superior cerebellar the anterior inferior cerebellar and the posterior inferior cerebellar arteries I do not think that this man's symptoms fit any of the syndromes which are described because loss of pain and temperature sensations Horner's syndrome and vocal cord and palatal paralysis usually are present

Did he have a tumor? I think he did because the symptoms fit those given by an expanding lesion and are usually rapidly progressive I think this was a metastatic tumor The symptoms are rapidly progressive in metastatic tumor Headache in cerebellar tumor is extraordinarily common This man complained bitterly of severe headache which was not relieved by any analgesics Xanthochromic spinal fluid is found frequently in cerebellar tumors without evidence of gross bleeding Frequently there is a choked disk but this man did not have one Of course there is pressure on the brain stem I think that is what was happening to this man I think his terminal episode when he became generally flaccid when he developed nuchal rigidity and respiratory difficulty was herniation of the medulla down through the foramen magnum In tumor within the brain there is generally as I said an increased pressure I do not know if he had one or not for there is no mention of this There is often an increased protein and normal cell count in the cerebrospinal fluid I do not think he had a primary tumor because they are much more common in children and I could not tie it to his liver and spleen disease with a primary tumor

I do not think he had aneurysm which is also an expanding lesion It gives more cranial nerve symptoms than he had and generally occurs in the base of the brain rather than within the substance of the brain Visual field defects are more prominent I do not think he had a brain abscess although this is a diagnosis which frequently is made only at autopsy You would think that at some time he would have had an episode of fever or chills or some signs of infection and I do not know how you could tie up these other diseases with a brain abscess

So far I have made two diagnoses cirrhosis and congestive splenomegaly I also said that he had tumor within his brain and it is possible he had metastatic tumor with bleeding also in his cerebral hemispheres But I have not located the primary tumor Now does he have a primary liver tumor? Well this is a very rare bird It occurs mostly in the Orient where it accounts for about 10 to 20 per cent of primary tumors There are two types There is the hepatoma which is a widespread or diffuse tumor and constitutes 80 to 90 per cent of all primary hepatic tumors and there is the cholangioma which is primarily a biliary canaliculus tumor There is generally pain over the liver and an enlarged liver it is seen in older people but the symptoms are like

cirrhosis particularly if it is a hepatoma. Does he have a silent tumor somewhere in his abdomen possibly the body of the pancreas? I could not say.

I think I will stop here and say that my diagnoses are cirrhosis of the liver with possibly a hepatoma or some other malignancy within the abdomen, cerebellar metastasis primarily to the left cerebellum and possibly to the cerebral hemispheres and congestive splenomegaly.

Doctor Favelle: I would like to mention that the spinal fluid did contain blood besides being xanthochromic.

Doctor Strickland \*: The point I want to raise is whether a cerebral arteriogram under local anesthesia could have been performed to establish the exact cerebellar lesion. It probably was a posterior cerebellar artery thrombosis.

Doctor Grabb \*: I think that abdominal pain, splenomegaly, anemia, and central nervous system disturbances are frequently seen in acute intermittent porphyria and this could be the case in this patient.

Doctor Schneck: This patient did not have very severe pain anywhere besides the terminal headache, or at least it is not mentioned. He had no paralysis and no weakness except terminally. These are quite major symptoms in porphyria. As far as the posterior cerebellar artery syndrome is concerned the onset usually is sudden, although it can come on slowly. There are sensory changes which are quite marked and this patient did not have them. He did not have Horner's syndrome. He had no loss of pain and temperature sensation. I do not think I could include this in the diagnosis.

Doctor Bortz \*\*: I would like to make a few comments on cerebellar disease. I think there are at least four significant symptoms in this patient that cannot be accounted for by cerebellar disease. These are the changes in intellect, the nuchal rigidity, the convulsions, and the pyramidal signs.

It has been recently reported<sup>3</sup> that there is a leukemia with a normal bone marrow in the preleukemic state. This is usually the monocytic type that can progress rapidly. With leukemia of this type we see splenomegaly and pancytopenia. In fact most of these patients in the preleukemic state are first seen with pancytopenia. I would also consider this diagnosis.

Another point I would like to mention is the cavernous transformation of the portal vein. This is one of the causes of Banti's syndrome. It is usually seen in young patients. They often have the same abnormal liver function tests as this patient had.

---

Capt. William M. Strickland, USAF (MC), Surgical Service.

Capt. William C. Grabb, USAF (MC), Surgical Service.

Capt. Alan I. Bortz, USAF (MC), Medical Service.

The final episode however in our patient was most likely due to bleeding although a tumor in the central nervous system is certainly a possibility

Doctor Strickland: In patients with cavernous transformation of the portal vein who have been operated on cirrhosis has been very minimal because the arterial blood supply was still good There are difficulties due to gastro-intestinal hemorrhage and portal hypertension in this disease

Doctor Schneck In regard to the comment about cerebellar disease it is perfectly true that in general we do not have convulsions and nuchal rigidity in pure cerebellar disease However in this case these symptoms were only seen terminally and they could be due to herniation of the cerebellar tonsils or to a terminal bleeding episode Dulling of intellect however is seen in cerebellar disease

#### Clinical diagnoses

- 1 Cirrhosis of the liver
- 2 Hypersplenism
- 3 Secondary thrombocytopenia
- 4 Central nervous system bleeding

#### Dr Schneck's diagnoses

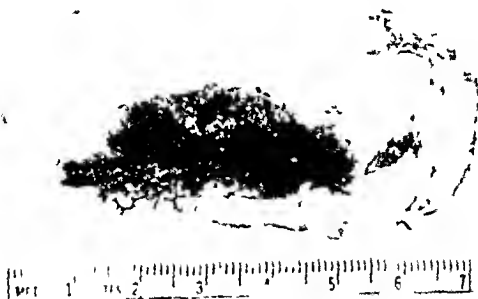
- 1 Cirrhosis of the liver
- 2 Malignancy in abdomen with cerebellar and cerebral metastasis
- 3 Congestive splenomegaly

#### PATHOLOGIC FINDINGS

Dr to Czernobylsky Significant gross findings of the post mortem examination were as follows

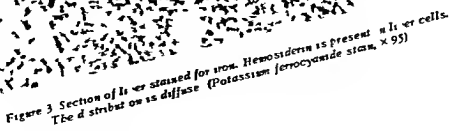
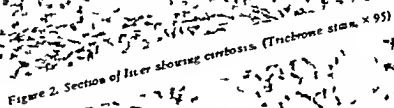
Scattered areas of ecchymosis were present on both arms Ankles showed grade 1 pitting edema There was a brown discoloration of the lower parts of both legs The mediastinal and chest organs were not remarkable Numerous large tortuous veins were present in the fat of the abdominal wall The peritoneal cavity did not contain any fluid The liver weighed 1115 grams The surface was markedly nodular and brown On cut section the normal architecture was not recognized The whole surface was transformed into a finely nodular gray brown tissue The spleen weighed 530 grams The surface was blue to purple No adhesions were present Cut section revealed a dark purple surface The stomach presented a round indurated lesion at the pylorus on the greater curvature This had the form of an ulcer with elevated indurated borders and measured 1 cm in diameter Both kidneys were enlarged The right kidney weighed 250 grams the left 370 The capsules stripped with ease and no gross abnormalities could be found on cut section The other abdominal organs were not remarkable The brain weighed 1620 grams before fixation A diffuse

subarachnoid hemorrhage involved the whole surface of the cerebrum and on cut section scattered petechiae were present in the white substance of all the lobes. On cut section of the cerebellum the center part the left side and part of the right side presented one large hemorrhagic area with destruction of cerebellar substance (fig 1)



*Figure 1 Hemorrhage in cerebellum.*

The microscopic examination of the liver showed a distortion of the normal architecture. Numerous pseudolobules were seen surrounded by large fibrous bands. Throughout the liver there was an increase in connective tissue proliferation of bile ducts and lymphocytic infiltration in portal areas (fig 2). The liver cells contained a brown pigment, which with special iron stain (potassium ferrocyanide stain) was found to be iron pigment (fig 3). The spleen showed severe congestion and a decreased number of malpighian bodies. A small amount of scattered pigment positive for iron was also found. When stained with the routine hematoxylin and eosin stains, the pancreas was found to be normal. The special iron stain revealed a small amount of iron positive granules scattered within the cytoplasm of many acini and occasional cells in the Langerhans islets (fig 4). All the other parenchymal organs, as well as muscle, were stained with iron stain. The bone marrow contained a small amount of hemosiderin. One cervical lymph node was also positive for hemosiderin. The lesion of the stomach was an early adenocarcinoma which did not penetrate beyond the muscularis mucosae. Microscopic examination of the brain confirmed the subarachnoid hemorrhage, petechial hemorrhages throughout the white matter, and a severe hemorrhage and necrosis of the cerebellum. There was no evidence of tumor or vascular occlusions in numerous



sections. On microscopic examination all the other organs including the kidneys, were essentially normal.

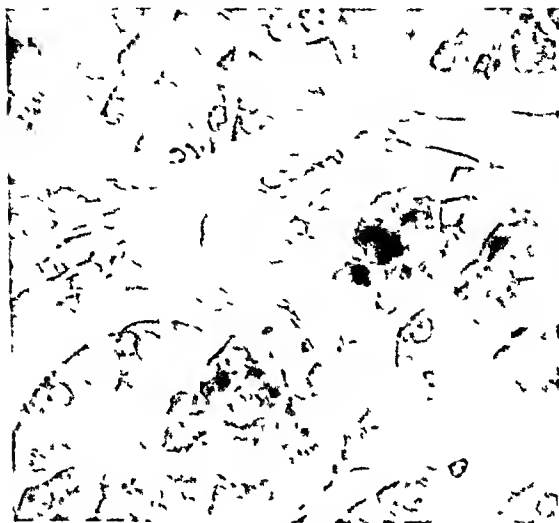


Figure 4. Section of pancreas stained for iron. Heavy hemosiderin granules are present in acini. (Potassium ferrocyanide stain,  $\times 950$ )

This case can be classified as an early idiopathic hemochromatosis. The hemosiderin distribution in the liver is characteristic of this disease. The pigment is very abundant and is mainly found within the liver cells and not in the reticulo endothelial system. There is cirrhosis with formation of numerous pseudolobules surrounded by large bands of fibrous tissue. There is hemosiderin in the pancreas although in this case there was absence of fibrosis. The spleen and bone marrow only have a small amount of iron pigment. All these changes have been described in hemochromatosis and cannot be explained on the basis of a simple Laennec's cirrhosis with increased hemosiderin in the liver. The reason that this patient did not develop the typical clinical picture and a very widespread distribution of iron in all the tissues is that he died at an early stage of his disease.

We do have difficulty placing the thrombocytopenia which caused the cerebral and cerebellar bleeding in the picture. Thrombocytopenia



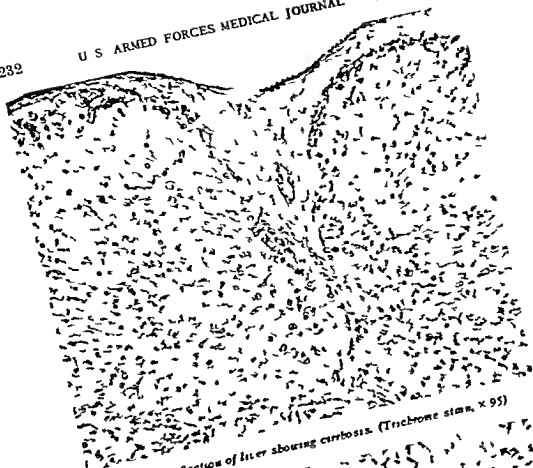


Figure 2. Section of liver showing fibrosis. (Trichrome stain,  $\times 95$ )

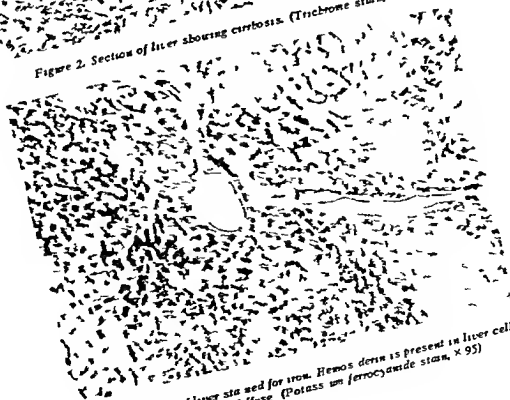


Figure 3. Section of liver stained for iron. Hemosiderin is present in liver cells. The distribution is diffuse (Potassium ferrocyanide stain,  $\times 95$ )

sections. On microscopic examination all the other organs including the kidneys were essentially normal.

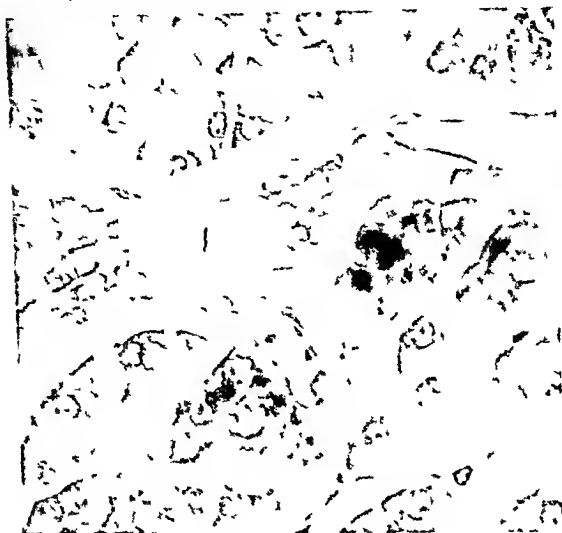


Figure 4. Section of pancreas stained for iron. Heavy hemosiderin granules are present in acini. (Potassium ferrocyanide stain,  $\times 950$ )

This case can be classified as an early idiopathic hemochromatosis. The hemosiderin distribution in the liver is characteristic of this disease. The pigment is very abundant and is mainly found within the liver cells and not in the reticuloendothelial system. There is cirrhosis, with formation of numerous pseudolobules surrounded by large bands of fibrous tissue. There is hemosiderin in the pancreas, although in this case there was absence of fibrosis. The spleen and bone marrow only have a small amount of iron pigment. All these changes have been described in hemochromatosis and cannot be explained on the basis of a simple Laennec's cirrhosis with increased hemosiderin in the liver. The reason that this patient did not develop the typical clinical picture and a very widespread distribution of iron in all the tissues is that he died at an early stage of his disease.

We do have difficulty placing the thrombocytopenia which caused the cerebral and cerebellar bleeding in the picture. Thrombocytopenia

has been described in hemochromatosis.<sup>4</sup> One explanation would be hypersplenism. The bone marrow obtained at autopsy however does not look like the bone marrow in hypersplenism. In contrast to the peripheral smear obtained during the patient's stay in the hospital the autopsy specimen is hypoplastic. We do think that this latter specimen is more reliable than the first one. In hypersplenism the bone marrow is rather hyperactive and there should be an increase or at least a normal number of megakaryocytes. Although we cannot rule out the possibility of hypersplenism the action of a chemical depressant on the bone marrow should be borne in mind. The severe anemia suggests long standing bleeding which had been going on for some time before his admission. Gastro intestinal bleeding is a good possibility here. Hemochromatosis alone cannot explain an anemia of such a degree.

Doctor Friedman: Were the skin lesions investigated any further?

Doctor Czernobilsky: Unfortunately no skin sections are available.

Doctor Gibson: Did the carcinoma of the stomach originate in an ulcer?

Doctor Czernobilsky: No. There was no evidence of an ulcer in the sections. This was a well-differentiated mucus secreting adenocarcinoma.

#### Pathologic diagnoses

- 1 Early idiopathic hemochromatosis
- 2 Cirrhosis of the liver (due to hemochromatosis)
- 3 Congestive splenomegaly
- 4 Thrombocytopenia (due to hypersplenism or chemical bone marrow depression)
- 5 Subarachnoid, cerebral, and cerebellar hemorrhage due to platelet deficiency
- 6 Adenocarcinoma of the stomach

Capt Herbert S. Friedman, USAF (MC), Chief Urology Service

Capt Bernard F. Gibson, USAF (MC), Chief Surgery Service

#### REFERENCES

- 1 Cecil, R. L. and Loeb, R. F. (editors) *Textbook of Medicine*. 8th edition. W. B. Saunders Co. Philadelphia, Pa. 1951, p. 772.
- 2 Alpers, B. J. *Clinical Neurology*, 3d edition. F. A. Davis Co. Philadelphia, Pa. 1954, p. 455.
- 3 Senn, C. M. and Dick, F. W. Megakaryocytic leukemia. *Am. J. Med.*, 20: 589-602, Apr. 1956.
- 4 Heilmeyer, L. De Hemochromatose. *Klinik, Eisenstoffwechsel und Pathogenese*. *Acta haemat.* 11: 137-151, Mar. 1954.

## PROGRESS IN AEROMEDICAL EVACUATION

L. RENDER BRASWELL *Colonel USAF (MC)*

**A**EROMEDICAL evacuation today stands at the threshold of new developments. Turboprop and jet-powered aircraft are soon to shrink our planet by shortening travel time, and evacuation activities will increase in comfort, speed, and convenience. Already, the familiar C 47 and C 54 types of patient carriers with their crowded litter tiers have been supplanted in domestic and overseas service by larger, faster, and more comfortable aircraft. Because the military practitioner who must transfer a patient to another hospital has little opportunity to inspect the evacuation aircraft during its short pickup stop, this article describes the scope and the methods of aeromedical evacuation.

Historically, organized evacuation of casualties from the battlefield came well before aviation appeared. Baron Larrey, surgeon in chief of Napoleon's Grand Army, recognized the importance of speedy evacuation and put the first horse drawn ambulance into use. This unit became known as the flying ambulance,<sup>1</sup> because it was so much faster than any other means of transporting the sick and wounded at that time.

Military aviation is older than is generally realized. However, it is well known that the balloon was used in our war between the states for observation and the direction of artillery fire. This soon led to the employment of the balloon as the first air borne patient carrier. Armstrong<sup>2</sup> reported that the first use of aerial means to transport patients occurred during the siege of Paris in 1870. At that time observation balloons removed 160 patients from the city.

An old medical admonition which often appears on the editorial pages of present day medical journals says, in essence "First be sure you do no harm." The need to re-emphasize this ancient principle seems to stem from the introduction of the imposing number of new therapeutic items developed in the past few years—the sulfas, the antibiotics, the antihistamines, and so on through the newest group—the ataractics.

In the aeromedical evacuation operations of the Military Air Transport Service (MATS), this basic safety principle is always kept in mind. In over six years since assuming military patient movement responsibility, MATS has transported well over a third of a million patients losing only two due to aircraft accident. This indicates a flying safety record which is most impressive when compared with the fatality rates for other modes of patient transportation.

Another safety matter of constant concern is communicable disease. It is generally believed that air travel increases the threat of spreading contagious disease. An exposed person might complete a long journey before symptoms appear. Because of modern therapy however very few patients need to be evacuated during the infectious stage of communicable disease. Patients in the MATS transport system have usually been under medical control before we receive them. All are screened by a physician to assure transportability from every standpoint. The physician prescribes any necessary special precautions to apply during flight. He excludes patients in the infectious stage of quarantinable disease. The flight nurse has complete authority to exclude passengers from any patient flight. Standard isolation techniques, such as the use of cubicles and segregation of wastes are applied in flight and continued until arrival at destination hospitals.

Substantial numbers of patients with pulmonary tuberculosis are still transported. An observation which tends to confirm that our defenses against communicable disease afford the patients and medical teams protection consistent with best present-day practice was made recently by a senior Public Health Service medical officer who made a transatlantic air evacuation flight to observe our methods of handling tuberculous patients. After the flight he stated "With the types of tuberculous patients that were being evacuated precautions taken while in transit seemed to be quite adequate both as to their individual care and to minimize hazards of infection of others patients or attendants."

Briefly, the system operates as follows. Patients from overseas travel by MATS aircraft to conveniently located domestic ports of aerial debarkation. Our domestic system moves them from the ports of entry to hospitals designated by the Armed Services Medical Regulating Office.

Movement control centers at specially chosen locations promote effectiveness and economy. These centers are located throughout the transport system. Presently six centers cover medical facilities within their geographical areas in the domestic system. They schedule the movement of patients and effect the most economical utilization of aircraft. They control the dispatching of 30 specially designed flying hospital wards and dispatch

planes consistent with the urgency of the patient movement. If the hospital commander describes the need as urgent, as in a life and death case, the airplane proceeds immediately to move the patient. When the medical facility requests priority movement, the flight is scheduled within 24 hours. Even routine patients must be air evacuated in less than 72 hours.

When MATS became responsible for transporting Department of Defense patients by air, it was forced to use modified cargo aircraft for completion of its mission. In recent years the medical staff has gained membership on the Aircraft Configuration Board, which studies and makes design recommendations for projected aircraft. This membership ensures that specifications for new cargo and personnel transport airplanes incorporate the requirements peculiar to patient transportation. As a result, three new transport types suitably adapted at time of delivery have since joined the MATS fleet: the four engine Douglas Liftmaster (C-118), which flies patients from Europe to the United States, the four engine Boeing Stratocruiser (C-97), which flies the Pacific routes, the four engine Lockheed Super Constellation (C-121C), which covers the southern routes to Puerto Rico and Panama, and the two engine Convair (C-131A), which operates within the continental limits of the United States. This last airplane demonstrates two significant "firsts." The Convair is the first to come from the factory especially constructed for patient transportation. As employed in MATS, it is the first airplane to be wholly restricted to aeromedical evacuation use. It incorporates the features that many years of extensive observation and experience have proved essential.

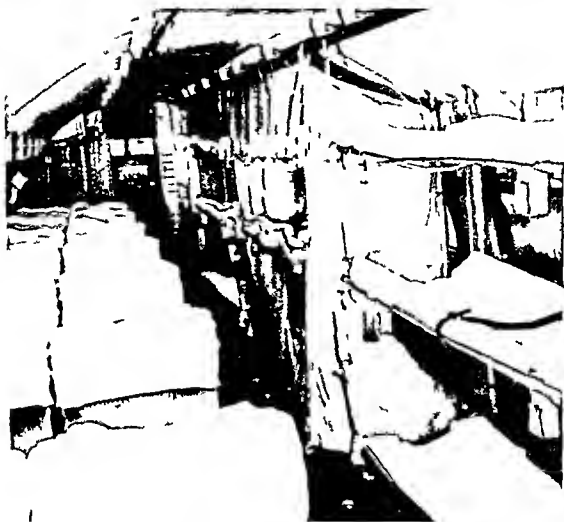
Some of these features, which now are also built into the other new transports mentioned above, are as follows. Vertically suspended litter assemblies may be adjusted to permit variable spacing, allowing patients to be more accessible to the medical crew, with improved ventilation and heating (fig. 1). Adjustable, suspension spacing permits maximum or minimum loading and better cushioning against normal flight motion and vibration. Modesty curtains, with rods appropriately fixed, may be completely drawn around each litter or each tier of four litters (fig. 2). The cabin heating system can cope with fluctuating temperatures and distributes heat uniformly throughout the cabin. Fresh air vents facilitate rapid air exchange. The exterior coating of fuselage, a solar heat-resistant paint, reduces cabin temperatures while on the ground. Interior insulation reduces the noise level within the cabin. Rheostated interior lighting is sectionalized. Lighting of desired intensity may be supplied individual litter tiers for patient care, while tinted windows reduce sun glare.



*Figure 1 Interior of C-131A (Convair) showing hospital ward appearance and depicting adjustable litter assemblies rearward facing seats, sectionalized lighting and chest respirator equipment.*

Rearward facing seats are able to withstand high decelerative forces enhance comfort and safety. They are light easily removable and may be stowed thus permitting flexibility in loading with litter patients. Medical personnel are seated so as to obtain the best view of their patients. Flight and medical crew members are accommodated with rest facilities adequate for long trips.

The interior of the aircraft has stainless steel or aluminum fittings which are easy to clean and painted so as to present a cheerful hospital ward atmosphere. A scuff board extends from the floor to window level. The deck covering further contributes to the ward atmosphere yet it can sustain the wear of capacity loads and has a nonskid safety surface. Because the cabin is



*Figure 2 Interior of C-131A (Convair) showing cockpit in background rearward-facing seats and compartmented litter tiers with adequate space for nursing care and patient comfort in flight*

pressurized elaborate oxygen systems are dispensed with, and low pressure walk around kits are used for therapy or emergency. Medical personnel communicate with patients or flight crew over a modern intercom system equipped with loudspeakers.

The crew enter and exit at the front of the aircraft, while patients board and debark at the rear, away from the confusion and noise of ground operations.

The new MATS galley, which will fit into any MATS transport, includes an electrical warming oven, hot cups, and circulating air refrigerator (fig 3). This galley is used to serve patients with precooked frozen meals, which are preferred for our purposes. The oven assembly is removable for cleaning or servicing.

Until recently, one of the major problems had been the movement of patients in respirator equipment. Because the large tank-type respirator weighs around a thousand pounds and operates

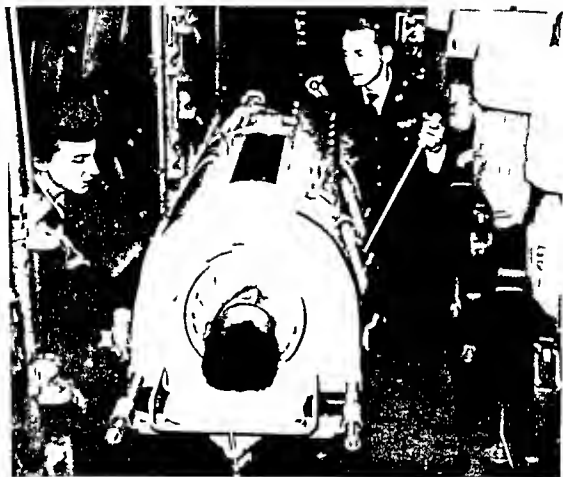




*Figure 1 Interior of C 131A (Convair) showing hospital ward appearance and depicting adjustable litter assemblies rearward facing seats, sectionalized lighting and chest respirator equipment*

Rearward facing seats are able to withstand high decelerative forces enhance comfort and safety They are light easily removable and may be stowed thus permitting flexibility in loading with litter patients Medical personnel are seated so as to obtain the best view of their patients Flight and medical crew members are accommodated with rest facilities adequate for long trips

The interior of the aircraft has stainless steel or aluminum fittings which are easy to clean and painted so as to present a cheerful hospital ward atmosphere A scuff board extends from the floor to window level The deck covering further contributes to the ward atmosphere yet it can sustain the wear of capacity loads and has a nonskid safety surface Because the cabin is



*Figure 4. Portable full body half tank respirator containing patient and attended by a flight nurse and medical corpsman. Hand operated bellows demonstrated by corpsman.*

For air terminal ground operations a multiple litter ambulance has been developed, being a modified commercial passenger bus fitted with the airplane type litter assemblies. A capacity of 16 litters thus greatly reduces the number of field type ambulances required at air terminals. This bus ambulance with "walk in" rear doors speeds loading and unloading, requires few attendants, and provides a more comfortable ride than the field type ambulance. Easily removable airplane type seats impart flexibility of loading arrangements because they allow the vehicle to be used as an ambulatory patient carrier and/or quickly converted to litter patient transportation as required.

Standard walk up ramps, now being service tested, eliminate the use of stairs and forklifts and adjust easily to airplane loading doors of differing heights. This device speeds loading and provides smoother handling of litter patients. Research continues into other types of patient loading apparatus, including a lift which is carried in the aircraft and operated by a hand winch. This lift, still experimental, is somewhat awkward but could be used in an emergency when no other equipment is available. tel

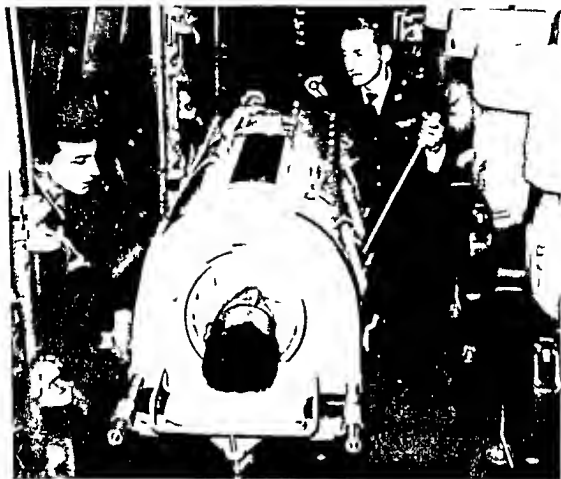


*Figure 3 MATS flight nurse uses a refrigerator and electrical warming oven in galley from which patients are served precooked frozen meals in flight*

on normal 110 volt alternating current it presented many loading and operating difficulties. The answer supplied by the Air Force School of Aviation Medicine, Randolph Field, Tex., is a portable full body half tank respirator. This unit has demonstrated by vital capacity measurements that it can provide adequate ventilation in totally apneic patients. Operating normally on regular household current, it weighs less than two hundred pounds and may be easily handled by a few people. The military metropolitan type ambulance will accommodate it where it operates from its own batteries. Loading aboard the aircraft no longer presents a major problem. In the airplane it fits easily into a normal litter tier and with its rectifier it operates from the 24 to 28 volt aircraft current. Should all power operation fail, the hand-operated bellows maintain passive respiration at any desired pressure (fig. 4).

Also modified for operation within the aircraft are other hospital items such as aspirators, incubators, and resuscitators. Added to this is a compact new nursing kit evolved and developed through experience, providing all medications normally required for in-flight nursing care.

In regard to survival equipment, the latest type of life vest designed to our specifications will float a patient wearing any type of cast and has a helicopter harness for easy pickup. It is easy to slip on and may be worn comfortably during an entire trip. Its fluorescent red color makes it easier to see from the air than the previous standard chrome yellow or orange.



*Figure 4. Portable full body bellows respirator containing patient and attended by a flight nurse and medical corpsman. Hand operated bellows demonstrated by corpsman.*

For air terminal ground operations a multiple litter ambulance has been developed, being a modified commercial passenger bus fitted with the airplane type litter assemblies. A capacity of 16 litters thus greatly reduces the number of field type ambulances required at air terminals. This bus ambulance with "walk in" rear doors speeds loading and unloading, requires few attendants, and provides a more comfortable ride than the field type ambulance. Easily removable airplane type seats impart flexibility of loading arrangements because they allow the vehicle to be used as an ambulatory patient carrier and/or quickly converted to litter patient transportation as required.

Standard walk up ramps, now being service tested, eliminate the use of stairs and forklifts and adjust easily to airplane loading doors of differing heights. This device speeds loading and provides smoother handling of litter patients. Research continues into other types of patient loading apparatus, including a lift which is carried in the aircraft and operated by a hand winch. This lift, still experimental, is somewhat awkward but could be used in an emergency when no other equipment is available.

There is also a forced air cooler to augment aircraft air conditioning systems during stops for patient loading in tropical climates. Combining these innovations in reliable aircraft with the services of well trained experienced flight nurses and medical corpsmen a load of patients can be successfully transported from Tokyo to Washington in less than 96 hours. This is routine now a dozen times a month.

### SUMMARY

Aeromedical evacuation merits understanding on the part of participating physicians now that the sciences of medicine and aviation have united to produce both efficient carriers and workable techniques. Preventive medicine practices minimize the danger of spreading communicable disease by air evacuation. Flight surgeons are able to participate in the design of MATS transport planes. Study and experience have produced a substantial list of desirable characteristics and equipment for patient carrying aircraft which are included in present air evacuation planes and programmed for future designs. A bus ambulance and a proposed standard loading ramp improve ground handling of patients. The new portable respirator accompanied by a highly specialized medical team assures the safe world wide transfer of poliomyelitis patients. Organizational progress guarantees close integration of patient movement control centers, medical teams, air crews, aircraft, and ultimately of the entire evacuation activity. The benefit to the individual patient as illustrated by the many military evacuees enhances and promotes the broader Army, Navy, and Air Force programs of military medical care. Finally experience has proved that a patient who can be moved by any means can be safely and quickly transported by air.

### REFERENCES

- 1 U. S. Air Force *Flight Nursing*. U. S. Air Force School of Aviation Medicine, Gunter Air Force Base, Ala. Mar. 1954, p. 3.
- 2 Armstrong H. G. *Principles and Practice of Aviation Medicine*. 3d ed. W. B. Saunders & Wilkins Co., Baltimore, Md. 1952, p. 421.
- 3 Hill E. L. Personal communication.

# PSYCHOTICS WHO COMMIT OFFENSES PUNISHABLE BY COURT-MARTIAL

Recommendations for Their Early Diagnosis and Treatment

ROBERT L. NELSON *Captain MC USAR*

**E**ARLY diagnosis and treatment of psychosis is of great importance regardless of the circumstances. It is a universal finding that the sooner intensive treatment can be established, the more favorable the therapeutic results. Early diagnosis becomes of even greater importance if failure to establish the diagnosis subjects the patient to prolonged and severe psychologic trauma which may make successful treatment impossible and give the illness a chronic character.

Such a situation exists when a psychotic member of the Army commits an offense punishable by court-martial, and diagnosis has not been established. If the diagnosis of psychosis is not made at the time of or shortly after the offense, the individual is subjected to the psychologic trauma of confinement, court-martial, and sentence. The sentence may include further stockade or disciplinary barracks confinement, fines, and dishonorable discharge. A perhaps even greater trauma is the attitude of society toward the individual who has committed an offense and is considered responsible for his actions. Delays involved in court-martial procedure can at times be prolonged and this may greatly add to the potential of the psychosis for becoming chronic.

Each year this hospital receives many psychotic patients on prisoner status. As officer in charge of the psychotic prisoner patients, I have had the opportunity to observe and evaluate many patients who would have benefited from earlier diagnosis of their psychosis, had this been possible. This article deals with findings on five patients who had undergone general courts martial, that demonstrate in the extreme the need for early diagnosis. Recommendations are made which, it is believed, will be of value in establishing early diagnosis in similar cases. The five patients selected had the following in common:

1 All had received general courts martial, were found guilty, and had begun serving the confinement portion of their sentence.

From Valley Forge Army Hospital, Phoenixville, Pa. Dr. Nelson is now at Harvard University, Dept. of Hygiene, 15 Holyoke St., Cambridge.

2 All were referred to this hospital when psychiatric observation following court-martial revealed the presence of a schizophrenic reaction

3 All were presented to a Board of Medical Officers at this hospital which determined that each one had been psychotic at the time of offense and court martial

4 Medical Board recommendations that unexpired portions of sentences be remitted and dishonorable discharges be revoked were approved and carried out by the Department of the Army

5 All failed to respond to treatment at this hospital were considered to have chronic schizophrenic psychoses and were discharged to civilian mental institutions for continued treatment

The following case histories summarize the clinical data of each of the five patients

### CASE REPORTS

#### Case 1

*Past history* The patient was a 21 year-old single white man His father aged 53 worked for the Fire Department and later for the Post Office The mother aged 45 worked solely as a housewife Both parents were described as being very strict This was more marked in the father who was extremely interested in military history and was a rigid disciplinarian with all the children The patient was the oldest of five siblings He was reared in a large city attended public school and quit at the age of 16 when he was in the 10th grade He then joined a drum and bugle corps and prior to entering service became increasingly interested in historical military figures He always had a limited social life and avoided relating himself closely to anyone There were no serious past illnesses

*Present illness* From early adolescence the patient was withdrawn and unable to have a trusting warm relationship with others including his immediate family He entered the Army at the age of 17 After completing basic training he received demolition training and was then sent overseas Shortly thereafter he became increasingly preoccupied with military concepts and was extremely impressed by efficient military regimes of the past He became critical of the American Army and frequently spent time on duty pretending he had no relationship to the Army By the time he had been overseas one year he began to feel Army authorities were suspecting him of being a communist and were planning ways in which he could be trapped and sentenced to the stockade or prison He believed papers referring to himself as a spy were purposely left about on the desks of important Army authorities

After being overseas two years he was court martialed for being found out of uniform while off duty and breaking a curfew regulation While serving stockade sentence he gradually became concerned about

the possibility of having syphilis, despite the lack of any signs or symptoms of this disease. He requested that a blood test be made and, because of an exaggerated fear of the blood-taking process, asked that Amytal Sodium (brand of amobarbital sodium) be given him prior to the test procedure. This was refused and he was instructed to go ahead with the blood test without sedation. He refused this order and received a second court martial with additional sentence.

While serving sentence the patient suddenly became excited, disrupted furniture in the stockade and attempted to escape confinement. When questioned regarding this by the officer in charge of his confinement, he again disobeyed a direct order and was court-martialed with further increase in sentence time. While still in confinement overseas he made a suicidal attempt and was seen briefly in psychiatric consultation. He was transferred to a disciplinary barracks in the United States where initial evaluation revealed the presence of disturbed paranoid ideation. Arrangements then were made for his transfer to this hospital with a diagnosis of schizophrenic reaction, paranoid type.

At this hospital he continued with psychotic ideation, continually interpreting all hospital activities as part of an investigation to make further charges against him. Affect was inappropriate; he remained aloof from patients and personnel and made repeated inappropriate verbalizations. He failed to respond to treatment which included a series of 16 electroconvulsive treatments. He was presented to a Board of Medical Officers which agreed with the following diagnosis: Schizophrenic reaction, paranoid type, chronic. Manifestations by inappropriate affect, unrealistic behavior and gross delusions.

## Case 2

**Past history.** The patient was a 23 year old single white male, father aged 65, had steady employment as a construction worker, mother was living and in good health. The patient had no siblings. He was reared in a large city, attended public school, quit school at age 16 while in the 10th grade. He worked as a shipping clerk for about one year as a shipping clerk. He was discharged from this period of employment. There were no other significant events.

**Present illness.** At the age of 17 he became extremely seclusive. Coincident with this was the discovery of a testicular varicocele. He was strongly opposed to surgery and would not consent. He remained in his room, refused contact with all others, refused to eat, and continually peered out the windows and doors, often calling him names in passing. He was hospitalized when food was taken to his room. He was allowed to continue in this manner.



19 he was finally persuaded to have a varicocelelectomy and following this he became even more withdrawn seclusive and suspicious To the great surprise of the family he responded to a letter from a friend wondering why he had not been in service and also responded to his draft call by going down for Army induction

While in basic training he felt strange and apart from others Outside the barracks he felt naked and as though others were watching him He felt that they were attracted to his physique and mannerisms and at the same time repulsed He completed basic training and was sent overseas There his symptoms intensified and he felt a strong drive to avoid the stares and implied accusations of those about him Motivated by these feelings he cut his wrists He told officials that it was not a suicide attempt but an attempt to avoid service By saying this he felt his family would not know of his disturbed feelings He was court martialled and transferred to a disciplinary barracks in the United States where initial psychiatric evaluation revealed withdrawal suspiciousness and sexual concerns The diagnosis of schizophrenic reaction was made and he was transferred to this hospital

Here he was withdrawn and hostile and revealed paranoid ideation and grandiosity He was only partially oriented and misinterpreted the remarks and gestures of others on the ward at times this led to hostile physical outbursts He also continued with grandiose ideation feeling himself capable of supreme accomplishment in the fields of education and entertainment Affect was continually flattened and inappropriate He failed to respond significantly to therapy He was presented to a Board of Medical Officers which agreed with the following diagnosis Schizophrenic reaction not elsewhere classified chronic severe manifested by prolonged period of withdrawal from reality beginning at age 17 paranoid ideation grandiose unrealistic self conceptions and suicidal attempts

### Cd e 3

*Past history* The patient was a 21 year old single colored man His father is believed to be dead and the patient had no memory of him He remembered the death and burial of his mother but was unable to recall dates His parents having died when he was quite young the patient was placed in an orphanage where he continued until several years before entering service He was the second of four siblings having two brothers and a sister all believed to be in good health He attended a school for retarded children and is not believed to have finished any school year After leaving school he worked briefly at manual jobs but had no steady employment and rarely engaged in productive activity There were no serious past illnesses

*Present illness* As noted above the patient failed to make a productive adjustment in school or work For several years prior to entering service he drank to excess and engaged in disturbing homosexual activity After completing basic training he was sent overseas There

he was frequently referred to the company sergeant and commander because of excessive drinking and inability to perform his duties, at times being markedly confused. He received a general court martial for disobeying direct orders. A psychiatric report 24 days following court martial indicated a diagnosis of chronic schizophrenic reaction, hebephrenic type. The psychiatrist recommended immediate hospitalization. The patient was hospitalized; a diagnosis of antisocial personality was made, and he was returned to confinement duty where bizarre behavior continued. He was rehospitalized and the diagnosis of chronic schizophrenic reaction, hebephrenic type was again established. He was then transferred to this hospital.

The patient continued to be grossly psychotic in ideation and behavior. He was completely disoriented as to time, place, and person. He assumed bizarre postures and frequently responded to hallucinatory experiences. He required continual direction in regard to all of his personal needs. In relation to others on the ward he displayed inappropriate smiling and laughter. He failed to respond to therapy including a series of 13 electroconvulsive treatments. He was presented to a Board of Medical Officers which agreed with the following diagnosis: Schizophrenic reaction, hebephrenic type, chronic severe manifested by markedly inappropriate affect with excessive unprovoked smiling and laughter, disturbed and confused sexual ideation and behavior, disorientation and hallucinatory experiences.

#### Case 4

*Past history.* The patient was a 17 year old single white man. His mother, aged 33, is believed to be in good health. The father was described as having been an alcoholic and at one time was confined in a state prison on a charge of nonsupport. When the patient was eight years old the parents were divorced and the mother subsequently remarried. The patient is the oldest of seven siblings. One sister is hospitalized with the diagnosis of schizophrenia. Following the divorce of his parents the patient was placed in boarding schools, foster homes, and orphanages for a period of seven years. The patient completed only seven grades of academic work and has never been consistently employed. There is no history of serious past illness.

*Present illness.* At the age of 15 the patient was hospitalized in a state hospital with a diagnosis of schizophrenic reaction, chronic undifferentiated type. He continued under state psychiatric care with three periods of hospitalization during which he received intensive treatment that included subcoma insulin shock, psychotherapy and occupational therapy. He was on conditional release from the state hospital at the time of his entering service at the age of 17.

Throughout basic training the patient was in frequent altercations with other enlisted men. During this period he was court martialed for assault but did not receive a sentence of confinement. At his next assignment he was court martialed for <sup>1</sup>

sentenced to confinement and transferred to a disciplinary barracks. There on psychiatric evaluation he was found to be psychotic experiencing auditory hallucinations and showing inappropriate affect and was considered a suicide risk. A Board of Medical Officers determined that the patient was not free from mental disease at the times of his offense and court martial and was unable to distinguish right from wrong at the time of his offenses. He was transferred to this hospital with a diagnosis of schizophrenic reaction not elsewhere classified chronic manifested by ideas of reference auditory hallucinations distortion of successful thinking and depression.

At this hospital the patient continued to show signs of schizophrenic psychosis including hallucinatory experiences delusional ideation preoccupation with symbolic thought and withdrawal. He failed to respond to therapy and was presented to a Board of Medical Officers which agreed with the following diagnosis: Schizophrenic reaction not elsewhere classified chronic severe manifested by ideas of reference auditory hallucinations severe affect disturbance and withdrawal.

#### Case 5.

**Past history** The patient was a 24 year old single white man. His parents were divorced when he was about four years old and the mother remarried when he was seven. His father worked sporadically as a truck driver and is believed to have been argumentative and a heavy drinker. His mother at the age of 60 still works as a sorter of tags having worked throughout adult life to help support her children. The patient was the second of three siblings. At the time of the parents' divorce the patient was placed in a day nursery. The family financial situation had always been near poverty and at times welfare agencies were needed. He began school at the age of six continuing through the fifth grade. He then attended vocational school for one and a half years stopping at the age of 14. Family financial needs necessitated his withdrawal from school and he obtained work as a truck helper. He had always tended to be a quiet socially withdrawn person who was unusually close to his mother. Throughout adolescence he had a stuttering speech defect and "ear trouble" at the age of 14.

**Present illness** When he was 19 the patient had a brief relationship with a girl that was abruptly terminated by her. From that time he felt that others spread rumors to the effect that he was a homosexual. He became more withdrawn socially. He was inducted into the Army at the age of 21 and after entering basic training felt that those with him at camp were spreading rumors about his engaging in perverted sexual activities. He began a series of three AWOL's motivated by his delusional ideation. While absent from his camp he would return home and remain in seclusion. He believed neighbors were also spreading rumors of a sexual nature. He finally received a general court martial after assaulting a noncommissioned officer and escaping confinement. He was found guilty and transferred to a disciplinary barracks. There

he became acutely excited, destructive of property, and harmful to himself. When finally quieted from this episode, psychiatric evaluation revealed his paranoid delusional ideation and he was transferred to this hospital.

Here his psychotic symptoms, including paranoid ideation, continued. He believed that others on the ward were spreading rumors of sexually perverted acts. He was continually suspicious of other patients and ward personnel and required observation because of assaultive outbursts. He failed to respond to therapy, including 17 electroconvulsive treatments, and was presented to a Board of Medical Officers which agreed with the following diagnosis: Schizophrenic reaction, paranoid type, chronic, severe, manifested by delusions of persecution, ideas of reference, withdrawal, seclusiveness, and acute episodes of aggressive behavior.

### DISCUSSION

Such pertinent data as was equally available on all five of the patients discussed is summarized in table 1 and reveals the following:

1. All were 24 years of age or younger.
2. Three came from homes with disturbed family relationships, having lost one or both parents before the age of eight. The other two showed a degree of family disturbance in that one had a rigid, strict father and the other's family failed to take appropriate action despite five years of gross psychosis.
3. All had psychiatric symptoms prior to entering service, three had had grossly psychotic symptoms, one had schizoid personality characteristics, and one showed a disturbed sexual adjustment, indulged in excessive drinking, and was unable to be productive in any sense.
4. All were privates and failed to adjust to Army life sufficiently to warrant promotion to higher grade.
5. All but one had had more than one court martial. The exception had frequently been referred to his sergeant and company commander because of excessive drinking and inability to perform duties satisfactorily.
6. All had psychotic symptoms prior to court martial.
7. Three received courts martial overseas, after beginning their first overseas assignment. The two who received courts martial in the United States committed their first offenses before completing basic training.
8. All committed offenses that are in some degree peculiar to the military setting, such as refusing medical diagnostic test, disobeying direct orders, and repeatedly going AWOL. In keeping with this, none had a history of a serious civilian offense.

TABLE 1. Summary of case histories of five psychotic general court martial offenders

	Case 1	Case 2	Case 3	Case 4	Case 5
Age when court martialled	21	22	21	17	24
Rank	Private	Private	Private	Private	Private
Army status	Regular Army	Army of United States	Regular Army	Regular Army	Army of United States
Present past history	Father was rigid disciplinarian and bedridden history	Family accepted five years of psychiatric adjustment without referring patient to treatment	Parental death when patient in early childhood. He was then with relatives and no phantasies	Parents present when patient in boarding school orphanage and to father	Parents divorced when patient age 4 spent time in nursery. Marked poverty at home
Psychiatric symptoms prior to entering Army	Limited social adjustment. Tendency to be suspicious of others	Psychotic behavior and attacks for five years	Schizophrenia. Disturbed homosexual adjustment. Excessive drinking. Forfeiture of assets	Psychosis requiring hospitalization one year prior to service	Paranoid delusions for three years
Present offense	Non	None	None	None	None

TABLE 1. *Summary of case histories of five psychotic general court martial offenders—Continued*

	Case 1	Case 2	Case 3	Case 4	Case 5
Total number of courts martial	3	2	1	2	4
General court martial offense	Refused blood test and further disobeyed direct order	Cut wrist in suicidal attempt	Disobeyed direct order	Disobeyed direct order	Assault of noncommissioned officer Escape from confinement
Where court martialled	Overseas	Overseas	Overseas	U.S.	U.S.
Length of time of psychotic symptoms prior to court martial	1 year	5 years	At least several months. Very disturbed adjustment for many years	1 year 5 months	4 years
From court to intensive treatment	1 year 9 months	6 months	6 months	5 months	1 year 6 months
	Schizophrenic reaction paranoid type	Schizophrenic reaction a e c	Schizophrenic reaction hebephrenic type	Schizophrenic reaction n e c	Schizophrenic reaction paranoid type

- 9 The time lapse between court martial and the institution of intensive psychiatric treatment ranged from 5 to 21 months
- 10 All were diagnosed as having schizophrenic reaction—b paranoid type two not elsewhere classified and one hebephrenic type

### RECOMMENDATIONS

A review of the data presented suggests the following recommendations which may aid in early diagnosis and in reducing delay in instituting appropriate treatment

Because all five patients had psychiatric symptoms prior to Army service and all had psychoses prior to committing a general court martial offense it is recommended that induction station and Army physicians be alert to such symptoms The best time for diagnosis to be made and treatment instituted is during routine contacts with physicians before disturbed acting out of svmp toms Any finding of a schizoid characteristic should be thoroughly evaluated with referral to a mental hygiene clinic if indicated

If diagnosis cannot be established earlier the following circumstances at the time of offense warrant a complete psychiatric evaluation

- 1 If there is evidence of disturbed adjustment prior to Army service
- 2 If the offender has failed to make a satisfactory productive Army adjustment This may be indicated by previous courts martial demonstrating a need for rehabilitation
- 3 If the court martial offense occurs before the offender has completed basic training or during his first overseas assignment
- 4 If the nature of the offense resembles a psychiatric symptom for example if the offense is a suicidal attempt or a refusal to carry out a direct order when associated with inability to perform other acts or if the offense shows bizarre motivation

When psychiatric evaluation is performed at the time of court martial it is recommended that it be thorough and complete Patients able to hide psychiatric symptoms from laymen for several years may be able to conceal them from well trained psychiatric personnel during the course of a "routine" interview It is important that the evaluation never become "routine" in any sense The characteristics of any schizophrenic reaction are always individual When possible prolonged direct observation of relations with others Also of great importance is complete evaluation is the patient's past history In the five cases cited all had a history both prior to and during Army service which pointed toward the eventual diagnosis

## SUMMARY

Data on five cases of schizophrenic reaction showed that all had prolonged delays in diagnosis and treatment, all had undergone general court martial, had been found guilty, and had begun sentence, and all were found on subsequent evaluation to have been psychotic prior to and at the time of their offenses. Recommendations are made to aid in early diagnosis and timely institution of appropriate treatment.

---

INTER AMERICAN MEDICAL CONVENTION  
TO BE HELD IN PANAMA CITY

The Second Inter American Medical Convention will be held at the Hotel El Panama in Panama City Republic of Panama 3-5 April 1957, under the sponsorship of the Medical Society of the Isthmian Canal Zone a chapter of the American Medical Association.

The scientific program will be wide in scope and on the order of a state medical convention in the United States. Speakers will be from North and South America with all papers presented in both English and Spanish. Among those who will read scientific papers are Dr. William F. Rienhoff, Jr. on "Surgery in Carcinoma of the Lung," Dr. Hawley H. Seiler on "Surgery of Pulmonary Lesions Other Than Cancer," and Dr. William A. Sodeman on "Amebiasis." "Mass Casualty Management" will be discussed by a team of research workers from Walter Reed and Brooke Army Hospitals headed by Colonel Joseph R. Schaeffer MC USA.

In addition to the scientific papers a full round of entertainment, including deep sea fishing and trips into the interior of Panama is planned for families who accompany the delegates.

For further information address Doctor William T. Bailey, Chairman Publicity Committee Box "E" Balboa Heights Canal Zone.



9 The time lapse between court martial and the institution of intensive psychiatric treatment ranged from 5 to 21 months

10 All were diagnosed as having schizophrenic reaction—two paranoid type two not elsewhere classified and one hebephrenic type

### RECOMMENDATIONS

A review of the data presented suggests the following recommendations which may aid in early diagnosis and in reducing delay in instituting appropriate treatment

Because all five patients had psychiatric symptoms prior to Army service and all had psychoses prior to committing a general court martial offense it is recommended that induction station and Army physicians be alert to such symptoms The best time for diagnosis to be made and treatment instituted is during routine contacts with physicians before disturbed acting out of symptoms Any finding of a schizoid characteristic should be thoroughly evaluated with referral to a mental hygiene clinic if indicated

If diagnosis cannot be established earlier the following circumstances at the time of offense warrant a complete psychiatric evaluation

- 1 If there is evidence of disturbed adjustment prior to Army service
- 2 If the offender has failed to make a satisfactory productive Army adjustment This may be indicated by previous courts martial demonstrating a need for rehabilitation
- 3 If the court martial offense occurs before the offender has completed basic training or during his first overseas assignment
- 4 If the nature of the offense resembles a psychiatric symptom for example if the offense is a suicidal attempt or a refusal to carry out a direct order when associated with inability to perform other acts or if the offense shows bizarre motivation

When psychiatric evaluation is performed at the time of court-martial it is recommended that it be thorough and complete Patients able to bide psychiatric symptoms from laymen for several years may be able to conceal them from well trained psychiatric personnel during the course of a "routine" interview It is important that the evaluation never become "routine" in any sense The characteristics of any schizophrenic reaction are always individual When possible hospitalization is recommended to make possible prolonged direct observation of relationships with others Also of great importance in complete evaluation is the patient's past history In the five cases cited all had a history both prior to and during Army service which pointed toward the eventual diagnosis

Although little in the way of specific knowledge has come down to us regarding the medical side of the War of 1812 and the Mexican War, scraps of information that have filtered down in one way or another, indicate with no reservation, that during both wars, physicians, in addition to their professional duties, were overburdened with additional work of a nonprofessional nature and were too often called upon to perform duties far afield from the practice of medicine. Listen to Surgeon General Thomas Lawson as he writes to the Adjutant General in the year 1840 "I have acted as quartermaster and as adjutant, and have been for months at a time in command of a company of men in the regular Army. I have also commanded a battalion and a regiment of men in the volunteer service, and have led them to a theater of war."

Nor did the situation change materially until the first year of the Civil War, when a Sanitary Commission was appointed, a commission that assumed wide powers and held sway in no menial fashion. Their investigations left them unhappy with the condition of hospitals, the lack of organized transport for the sick and wounded, and a general situation which they interpreted as one of stagnation. Their decision was to institute a reform and to name a new surgeon general.

They chose a young 34 year old assistant surgeon, William Hammond, who had already served with the Army in the far west, gained recognition as a medical writer, and held the chair of anatomy and physiology at Maryland. Hammond rejoined the Army at the outbreak of war. This officer was to be a controversial figure throughout his Army career and even afterward, but there remains no doubt that he brought to his assignment unbounded energy, keen understanding and unusual foresight.

In his annual report for 1862, General Hammond recommended "the establishment of a permanent hospital and ambulance corps, composed of men specially enlisted for duty in the Medical Department, and properly officered, who shall be required to perform the duties of nurses in the hospitals, and to attend the services of the ambulances in the field."

General Hammond cleverly motivated his effort to obtain a hospital corps by pointing out that such a corps would allow several thousand detached men serving in hospitals to return to their own regiments. Still no enlisted corps was granted. But Hammond refused to be stymied easily. He anticipated the nonconcurrence of those to whom his appeal was directed, and asked for civilian nurses and cooks to live in the general hospitals. When this recommendation won approval, he organized a hospital corps for duty in general hospitals. He prescribed uniforms, physical qualifications, discipline, mode of payment, and in every way had himself

a quasi military organization These units were the forerunners of our hospital medical detachments of today

Our next overt report as to the Hospital Corps came in 1887, in the annual report of Surgeon General John Moore, wherein it is noted that "the law to organize the Hospital Corps having been signed by the President transfers of men were being made from the line of the Army as rapidly as possible "

A year later he again commented "The organization of the Hospital Corps is nearly completed 614 privates have been transferred to it from the line 24 of whom were found qualified after examination for the position of acting hospital steward and so detailed 125 vacancies remain 9 for civilian, 10 for privates 81 for acting hospital stewards and 25 for hospital stewards "

Colonel Ashburn might well be quoted again on this subject as follows "This was an event truly great in the history of the Medical Department but its greatness is not apt to be appreciated by the present generation of medical officers whose whole service has been familiar with the work of the highly trained female Nurse Corps which has been part of the Army since the Spanish American War But prior to that war and after 1888 there was only the Hospital Corps It speedily developed a splendid corps spirit, took great interest in its work developed many excellent technical assistants for operating room and laboratory and enabled the medical officers to organize and conduct their hospitals in the (then) most modern manner In the hospital and in the field they rang true "

Little concrete writing is available today as to further exploits of the Hospital Corps Surgeon General Sutherland mentions the blooding of the Corps in the last of the Indian Wars in his report of 1891 In the same year Captain John Van R Hoff Assistant Surgeon in reporting on the battle of Wounded Knee noted "I have heretofore had the honor to submit many reports and suggestions regarding the Hospital Corps under various conditions of service in post camp and field but it was only recently I had an opportunity to see its working under the crucial test of battle It is but faint praise to say that it more than met my expectations

The Hospital Corps continued as an entity of the Medical Department and performed its mission well In the Spanish American War it expanded to almost seven times its size performing creditably throughout the war When it returned to its normal peacetime strength after the war a period of optimism set in due to legislation allowing an increase of 50 per cent in hospital stewards This period lasted only about two years when further legislation eliminated this heartening situation A new basis for Hospital Corps manpower was announced and the "ancient and

honorable title of hospital steward," as Colonel Ashburn rightfully termed it, passed from Medical Department terminology. This marked the close of some one hundred and twenty five years of ancestry in the evolution of the Medical Service Corps.

We now approach the more modern beginnings of your Corps, leaving "ancient" history and drawing near to those times which are not apart from the memory of living people. All that has transpired until this point conclusively demonstrates the need for an ancillary corps within the Medical Department.

In June 1916, anticipating the seemingly inevitable participation of our country in the European War, Congress gave the President authority "to increase temporarily the military establishment," thus providing the legal basis for an ancillary corps within the framework of the Medical Department.

It was evident, almost forty years ago, as it was to be evident in other similar circumstances, that the Medical Department, once embroiled in an extensive war, would face the problem of not having enough medical officers to provide proper professional care to the large numbers of casualties that might be expected. It was logically reasoned that if a group of officers could be obtained to perform the nonprofessional duties of the Medical Department, more physicians would be available to render necessary professional care to the sick and wounded.

General Gorgas, The Surgeon General, recommended the establishment of the Sanitary Corps, and when his recommendation was approved, this Corps became active within the Medical Department in the summer of 1917. The empowering legislation authorized the appointment of "citizens of the United States who are found under regulations established by the Secretary of War to possess special skill in sanitation, sanitary engineering, in bacteriology or other sciences related to sanitation and preventive medicine, or who possess other knowledge of special advantage to the Medical Department."

Obviously, the primary reason for establishing the Sanitary Corps was the crying need of the Medical Department for officers capable of relieving medical officers of administrative duties and certain other nonprofessional medical duties. Another reason existed. When World War I was forced upon us, there was no avenue of approach to a commission for our senior noncommissioned officers of the Medical Department, due to its singular construction. Other branches of the Army had no such restriction, and many senior noncoms were seeking and obtaining commissions in the Infantry, the Quartermaster Corps, the Adjutant General's Corps, and in other branches. Should sizable numbers of our senior noncommissioned officers apply for transfer to other

obtain commissions their skills would be lost at a time when most sorely needed—during the time of buildup, when highly trained cadremen would be most essential. Having the Sanitary Corps at hand eased this potentially dangerous situation considerably and we were able to offer our most capable noncommissioned officers a chance to gain officer status within our own Department.

With the rapid influx of civilians with specialties and skills allied to medicine and highly qualified and trained enlisted men, the Sanitary Corps expanded overnight. These individuals served with distinction throughout the entire war in just about every imaginable position in which their presence could be used. No echelon of the Medical Department was without its share of Sanitary Corps officers from post camp and station through division level and up to the Office of the Surgeon General itself where Sanitary Corps officers were assigned to the Personnel Administrative and Dental Divisions as well as to the Sanitary Division.

The Sanitary Corps was a healthy and long lived organization, a worthy antecedent of your healthy Corps of today. Although it had never gained the status of a regular component of the Medical Department having been constituted for the emergency period of World War I, it managed to remain alive between the two World Wars in Reserve status. Reactivated in World War II, it flourished until its active members and its Reserve component were absorbed in 1947. When it passed from the scene it left behind a record of over thirty years of faithful and dedicated service to the Army and to the nation.

The scattering to the four winds of the officers of the Sanitary Corps in the confusion of the post-World War I demobilization served to pinpoint the continuing need for an ancillary corps within the Medical Department. Surgeon General Merritt W. Ireland in 1920 recommended that such a corps be established and asserted that it should be called the Medical Service Corps. This some 27 years before your present Corps was born. Speaking before a Senate Committee General Ireland said in part: "Then there is another provision that I would like to have considered by the committee and that is the establishment of a new corps in the Medical Department and it can be done without expense and without increasing the number of officers and I think probably with a little saving. The proposition is that we shall have a Medical Service Corps and that it shall be made up of men who have served at least five years as soldiers and at least three years shall have been in noncommissioned officer's grade. At the end of that time after passing a prescribed examination he can be commissioned in the Medical Service Corps. They are going to do the work that we are now doing with highly trained

medical officers, and if allowed, those highly trained medical officers can return to their professional work. This will be an advantage in many ways. It will give encouragement to the members of the Hospital Corps, it will give him a future, and we will get a much better class of men into the Hospital Corps because he sees a majority awaiting him if he can make good."

General Ireland's recommendation for a Regular Army and Reserve Corps of nonprofessional officers was in part adopted. His recommendation that a Medical Service Corps be established was not accepted, but legislation permitting the Medical Administrative Corps was passed in June 1920.

For those of you who do appreciate a "romantic" touch, I might add that General Ireland, in his first year as a member of the Medical Corps, served at Fort Riley, where he had charge of the first company of instruction of the Hospital Corps that was ever organized. The year was 1891. His direct superior officer was a Major John Van R. Hoff, whom I quoted a short time back. It seems to me most appropriate that General Ireland, whose first assignment concerned itself with your antecedent group, should not as spokesman—some thirty years later—in recommending a vitally needed ancillary corps within the Medical Department.

Members of this new Corps had need of their pioneer background. General reductions in the strength of the Army, as well as legislation which appeared to discriminate against them, whittled the size of the Corps nearly in half. Arbitrary limitations as to grade expectancy was a bitter pill to swallow. In common with their Medical Corps associates, members of the new Corps began to feel the burden of "additional duties."

General Ireland now came forward with still another recommendation. He proposed amendment of the National Defense Act to establish a Medical Auxiliary Corps to consist of some 140 officers, *in grades from second lieutenant to colonel*. His idea was to recommission Medical Administrative Corps officers in the new Medical Auxiliary Corps in corresponding grades. The arbitrary restriction as to highest grade would thus be removed, and officers could be promoted on the basis of length of service just as the members of the other corps of the Medical Department were promoted. While it was true that not too many officers on duty at the time the bill was proposed would profit greatly by its passage, it would provide a firm basis for future career personnel, spelling out as it did the appropriate use of such officers.

In his annual report of 1926, General Ireland referring to the limitation of income for Medical Administrative Corps officers states "It has never been understood by this office how so and discriminatory a measure as this crept into the bill."

final days of its passage. It practically means that an officer of the Medical Administrative Corps of long service at present in the grade of first lieutenant and promoted to captain receives no increase of pay. It is proposed that hereafter they be promoted after stated periods of service on up to the grade of colonel. This seems to be of particular importance with reference to the younger men now being commissioned in the Medical Administrative Corps.

In years past many of the enlisted men of the Medical Department looking forward to a commissioned career have sought and qualified for a commission in the line. This bill if enacted will offer to these enlisted men of the Medical Department equal opportunity in their own department and become a big factor in building up the type of enlisted force the Medical Department is trying to develop and urgently needs."

General Ireland's proposed legislation was not enacted. The medical officers continued to be burdened with too much work of a nonprofessional nature. Until his retirement in 1930 General Ireland continued his running battle to increase the numbers of all corps of the Medical Department without success.

In a letter accompanying his last annual report General Ireland paid tribute to the Medical Administrative Corps, praising its usefulness and its over-all operation. Throughout his tenure as Surgeon General he was forever in the forefront of those who tried to help the Medical Administrative Corps and its officers. He did everything that was humanly possible to dissolve the inequities under which the corps labored at that time. Even though little in the way of expanded career incentives was obtained during his stewardship, his willingness to champion the Medical Administrative Corps and its officers and the zealous efforts he put forth in their behalf lifted their morale as nothing else could have done. With the retirement of General Ireland, one of the greatest champions the Medical Administrative Corps ever had, passed from the active scene.

In 1935 a bill to authorize a Medical Auxiliary Corps was again introduced into the House of Representatives. This history and background of this particular bill is somewhat shrouded in mystery; practically all we know about it is that it was introduced by a Representative McSwain. It was analogous to the bill that General Ireland had proposed some time earlier, differing in proposing percentage-wise limitations in the various grades and also in providing for pharmacists and members of other professions allied to medicine to be commissioned in the proposed corps. This bill died in committee.

Both the Regular Army and the Reserve Medical Administrative Corps continued to decrease in size until 1941 when numerous

reserve and National Guard officers were called up for the duration of the emergency. Planning in preparation for possible global war led to the opening of officer candidate schools for Medical Administrative Corps applicants, first at Carlisle Barracks and later at Camp Barkley. I will wager that a goodly percentage of those of you who are listening to me tonight gained your commissions at one or another of these schools, whose graduates were to see service in every corner of the globe.

The Pharmacy Corps, in one sense, could trace its past to a point in time preceding even that of the Sanitary Corps, inasmuch as legislation concerning the utilization of pharmacists in the Medical Department had been proposed in Congress before 1917. Initially opposed to some features of the bill, General Ireland with the passage of a few years became amenable to the inclusion of a "certain number of pharmacists in the Army." They would have fitted very well into his proposed Medical Service Corps of 1920.

Legislation to commission pharmacists in the Medical Department was introduced into Congress in 1935 and passed in June 1936. The National Defense Act of 1920 was amended to allow a maximum of 16 pharmacists commissioned status in the Medical Administrative Corps. The stringency of this act was not recognized immediately, but if it were to be followed, it would preclude appointments other than of registered pharmacists in the Medical Administrative Corps in the future, and would ultimately have reduced the Corps from its authorized total of 72 officers to a total of only 16 officers.

Surgeon General Reynolds, commenting on this legislation in 1936, had this to say: "It is not as drug clerks, primarily or exclusively, that we contemplate the services of these officers, but more with the meaning 'pharmacy' as it is termed in the armies of Continental Europe, where the 'pharmacist' is a highly trained and educated officer who is concerned with practical sanitation, the procurement and development of military medical supplies and equipment, and the technical service in the chemical, bacteriological, serological, and x-ray laboratories."

In 1942 a bill to establish a Pharmacy Corps was introduced by Congressman Carl T. Durham, of North Carolina, in May 1943, it was approved with minor modifications. The President signed it into law in July 1943, and the Regular Army component of the Medical Administrative Corps passed into history after an active life of some twenty-three years. The Reserve component of the Medical Administrative Corps kept its name temporarily. The Pharmacy Corps was absorbed into the Medical Service Corps when that branch came into being in August 1947.



final days of its passage. It practically means that an officer of the Medical Administrative Corps of long service at present in the grade of first lieutenant and promoted to captain receives no increase of pay. It is proposed that hereafter they be promoted after stated periods of service on up to the grade of colonel. This seems to be of particular importance with reference to the younger men now being commissioned in the Medical Administrative Corps.

In years past many of the enlisted men of the Medical Department looking forward to a commissioned career have sought and qualified for a commission in the line. This bill, if enacted, will offer to these enlisted men of the Medical Department equal opportunity in their own department and become a big factor in building up the type of enlisted force the Medical Department is trying to develop and urgently needs."

*General Ireland's proposed legislation was not enacted.* The medical officers continued to be burdened with too much work of a nonprofessional nature. Until his retirement in 1930 General Ireland continued his running battle to increase the numbers of all corps of the Medical Department without success.

In a letter accompanying his last annual report General Ireland paid tribute to the Medical Administrative Corps, praising its usefulness and its over-all operation. Throughout his tenure as Surgeon General he was forever in the forefront of those who tried to help the Medical Administrative Corps and its officers. He did everything that was humanly possible to dissolve the inequities under which the corps labored at that time. Even though little in the way of expanded career incentives was obtained during his stewardship, his willingness to champion the Medical Administrative Corps and its officers, and the zealous efforts he put forth in their behalf, lifted their morale as nothing else could have done. With the retirement of General Ireland, one of the greatest champions the Medical Administrative Corps ever had, passed from the active scene.

In 1935 a bill to authorize a Medical Auxiliary Corps was again introduced into the House of Representatives. This history and background of this particular bill is somewhat shrouded in mystery; practically all we know about it is that it was introduced by a Representative McSwain. It was analogous to the bill that General Ireland had proposed some time earlier, differing in proposing percentage-wise limitations in the various grades and also in providing for pharmacists and members of other professions allied to medicine to be commissioned in the proposed corps. This bill died in committee.

Both the Regular Army and the Reserve Medical Administrative Corps continued to decrease in size until 1941 when numerous

reserve and National Guard officers were called up for the duration of the emergency. Planning in preparation for possible global war led to the opening of officer candidate schools for Medical Administrative Corps applicants, first at Carlisle Barracks and later at Camp Barkley. I will wager that a goodly percentage of those of you who are listening to me tonight gained your commissions at one or another of these schools, whose graduates were to see service in every corner of the globe.

The Pharmacy Corps, in one sense, could trace its past to a point in time preceding even that of the Sanitary Corps, inasmuch as legislation concerning the utilization of pharmacists in the Medical Department had been proposed in Congress before 1917. Initially opposed to some features of the bill, General Ireland with the passage of a few years became amenable to the inclusion of a "certain number of pharmacists in the Army." They would have fitted very well into his proposed Medical Service Corps of 1920.

Legislation to commission pharmacists in the Medical Department was introduced into Congress in 1935 and passed in June 1936. The National Defense Act of 1920 was amended to allow a maximum of 16 pharmacists commissioned status in the Medical Administrative Corps. The stringency of this act was not recognized immediately, but if it were to be followed, it would preclude appointments other than of registered pharmacists in the Medical Administrative Corps in the future, and would ultimately have reduced the Corps from its authorized total of 72 officers to a total of only 16 officers.

Surgeon General Reynolds, commenting on this legislation in 1936, had this to say: "It is not as drug clerks, primarily or exclusively, that we contemplate the services of these officers, but more with the meaning 'pharmacy' as it is termed in the armies of Continental Europe, where the 'pharmacist' is a highly trained and educated officer who is concerned with practical sanitation, the procurement and development of military medical supplies and equipment, and the technical service in the chemical, bacteriological, serological and x-ray laboratories."

In 1942 a bill to establish a Pharmacy Corps was introduced by Congressman Carl T. Durham, of North Carolina, in May 1943, it was approved with minor modifications. The President signed it into law in July 1943, and the Regular Army component of the Medical Administrative Corps passed into history after an active life of some twenty-three years. The Reserve component of the Medical Administrative Corps kept its name temporarily. Pharmacy Corps was absorbed into the Medical Service when that branch came into being in August 1947.

The performance of the Medical Administrative Corps and its officers in World War II has been sufficiently chronicled, it is too well known to require further treatment at this time. Your Corps and its individual officers faced and met responsibility with confidence and efficiency and by the time hostilities were over they were performing creditably almost every type of duty except the actual practice of medicine, dentistry and nursing within the purview of the Medical Department.

General Norman Kirk, sensing the unwieldiness of the administrative groupings within the Medical Department after World War II, recommended the establishment of a single corps which would incorporate the skills and administrative and technical knowledge found in the Sanitary Corps, the Medical Administrative Corps and the Pharmacy Corps. He recommended that it assume the name and be patterned after the corps originally proposed by General Ireland in 1920.

The initial period of regrouping, the overwhelming administrative difficulties which arose and the host of problems allied to your reorganization were met in characteristic fashion by Colonel Goriup, your first chief, and his able assistants. Colonel Goriup and his successor, Colonel Black, did yeoman work in their terms as Chiefs of the Corps. I wish that I had more time to delve into the background of some of the problems these officers coped with and the tremendous effort expended in their solution. I believe we are too near to their work to see it in its true perspective.

I do not wish to seem blunt or brief in speaking of the Korean campaign. The manner of performance of duty of our Medical Service Corps officers is here again too recent to need analysis or comment. I see here tonight many officers whose service in Korea was a service of high distinction. In such circumstances it is not proper to discuss history with men who helped in their own way to make that history.

After this short wandering tour through some of the highlights of the history of your Corps, we reach the present. And what about this Medical Service Corps of today? Or of tomorrow?

Your Corps is headed up by another dynamic officer, Colonel Bernard Aabel, who reflects the high purpose and ability to get things done that characterized the two Chiefs who preceded him. Your senior officers are bastions of strength. On every hand we have junior officers whose performance of duty is superior. One of the nicest things about our present crop of Medical Service Corps officers is that none of them are just "going along for the ride." The Medical Service Corps of today is composed of individuals who are dedicated to the highest principles of the Army Medical Service, the United States Army and this great nation of ours.

But what about tomorrow?

Much as I wish it were otherwise, I have no crystal ball, and I am not able to define the kind of Medical Service Corps that tomorrow will bring to, or require of, the Army Medical Service. I do know that it will continue to offer fruitful careers to qualified men whose interests in life include work in paramedical fields and service to their country, that much will remain unchanged.

Within the past year or so new career incentives and new career opportunities have become available to you. I refer to the careers that have opened for you in such fields as medical intelligence, military missions and particularly in the Logistics Officer Program. In encompassing the whole area of service support, this latter program alone is breath taking in its possibilities. These are optimum times for the advancement of your Army careers. A newer and broader vista of opportunity and promise will open to you in the rich future that beckons to the Medical Service Corps.

Your Corps stands in the unique position of being old enough to have its own traditions, yet young enough to be impressionable. You can gain new life from the reservoir of your past experience that will help you to look forward with the keen vision that tomorrow's problems will demand. If, as the historians say, the Past is Prologue, your past record tells me that your officers will write still finer chapters in your history.

One thought must give us pause in attempting to preview your future. I believe you must heed the injunction made by Secretary of the Army Wilber M. Brucker recently. Secretary Brucker said "We derive great inspiration from the magnificent achievements of yesterday, but unless we translate that inspiration into equally splendid accomplishments today, the American way of life cannot long survive." This challenge will remain constantly with you as you move forward.

## CASE REPORTS

### Oral Surgery Complications Caused by Flight

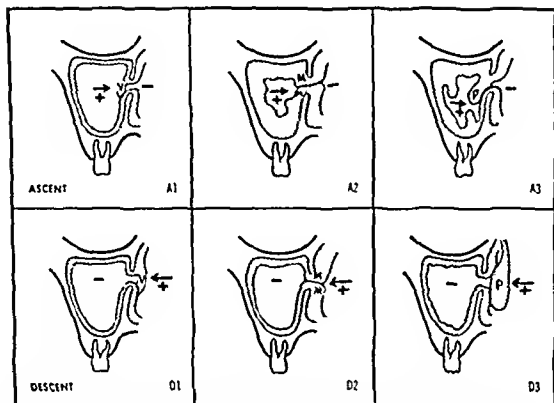
LUCIAN SZMYD *Major USAF (DC)*

**T**HE extraction of posterior maxillary teeth often necessitates the removal of considerable alveolar bone. Large areas of antral membrane thus may be deprived of bony support. The purpose of this article is to discuss some of the physical factors encountered during flight which may affect the postoperative course of such cases. The case reported here demonstrates the effect of changes in atmospheric pressure created during flight on the Schneiderian membrane of an abnormal sinus following the surgical extraction of maxillary posterior teeth.

When the maxillary sinus is subjected to variations in barometric pressure during flight equilibrium between the pressure within the cavity and atmospheric pressure is established at a rate that depends upon the size of the ostium and the extent of change in barometric pressure.<sup>1</sup> The extent of change in atmospheric pressure depends upon the altitude and the rate of vertical ascent or descent.<sup>2</sup> When the maxillary sinus is normal and the ostium is patent differences in pressure between the air within the sinus cavity and the surrounding atmosphere are brought into equilibrium quickly and uneventfully.<sup>3</sup> Obstruction of the ostium by redundant or hypertrophied tissue, anatomic deformities, polyps, mucus or purulent exudate may delay or prevent equilibration of pressure<sup>4</sup> (fig. 1).

Varying atmospheric pressure changes are created by flight. Operational aircraft fly at altitudes over 40 000 feet and are capable of vertical ascent at rates of 100 feet per second and dive at speeds of 1 000 feet per second. Operational aircraft flying at altitudes exceeding 40 000 feet maintain their cabin pressure at approximately 16 000 to 20 000 feet. Conventional transport aircraft fly at altitudes of 6 000 to 10 000 feet and ascend and descend at rates approximating 10 feet per second. Commercial transport aircraft flying at altitudes exceeding 10 000 feet maintain their cabin pressure at approximately 6 000 to 10 000 feet.<sup>5</sup>

Whenever the antral membrane is exposed or perforated in an oral surgical procedure the patient is always cautioned against



*Figure 1 (A) During ascent any valvular formation within the sinus cavity will prevent the exit of air from the sinus as the atmospheric pressure decreases. (D) During descent and increase of atmospheric pressure similar formations on the nasal side of the ostium will prevent the entrance of air into the sinus.*

**A Ascent**

- A1 V—Developmental flap valve formation of sinus mucous membrane  
 A2 M—Swelling of the mucosa of sinus with flutter valve effect  
 A3 P—Mucosal polypus in sinus constituting a ball valve

**D Descent**

- D1 V—Developmental flap valve formation of nasal mucosa.  
 D2 M—Swelling of nasal mucous membrane with flutter valve effect  
 D3 P—Polypus presenting in nasal fossa and acting as a ball valve.

(Reproduced from *Contributions to Aviation Otolaryngology* by E D D Dickson Headley Brothers London 1947)

snoezing or blowing of the nose because these acts affect the pressure in the maxillary sinus. This can readily be demonstrated by blowing the nose in the presence of a small perforation of the antral membrane. Air bubbles will be emitted from the perforation site due to the increase in pressure of the gases in the antrum.

The following case illustrates that when the Schneiderian membrane of an abnormal sinus is exposed or perforated following a surgical procedure, the patient should be cautioned not only against sneezing and blowing of the nose, but also against travel.

## CASE REPORT

A 23 year old airman was referred by the ear nose and throat department to the oral surgery service with a large oroantral fistula. Six weeks prior to admission the right maxillary first and second molars were extracted. The patient stated that considerable alveolar bone had been removed in order to perform the extractions and that he was cautioned against blowing his nose or sneezing afterward. Healing was uneventful until the patient took an airplane flight one week after the operation. After landing the patient noted a large mass protruding into his mouth at the extraction site (fig 2). A diagnosis of a herniated antral membrane was made and the tissue was excised. The patient was then referred to the oral surgery service for treatment.



Figure 2 Photograph showing the herniated antral membrane in the right molar area following flight. (Mirror image shows the palatal view.)

Clinical examination revealed an oroantral opening 1 cm in diameter in the area of previous extractions (fig 3). A probe passed readily through the opening into the right maxillary sinus. A large polyp was obstructing the opening but no evidence of drainage from the maxillary sinus was noted. No lymphadenopathy or asymmetry of the face were seen on admission. Roentgenographic examination revealed a generalized opacity of the right antrum (fig 4A).

From clinical and roentgenographic evidence it appeared that three conditions had existed prior to air travel (1) infection of the maxillary sinus (2) lack of bony support for the nasal membrane in the area of the herniation, and (3) a defect in the integrity of the oral mucous membrane in the area of the herniation



*Figure 3 Photograph showing the oroantral fistula.*

Using general anesthesia an orthodox Caldwell Luc approach was used to enter the right maxillary sinus. After the removal of polyps and purulent exudate a nasoantral window was made. The antrum was then packed with iodoform vaseline gauze. The end of the pack was passed into the nasal cavity and the original incision was closed without drainage. After de epithelization of the fistulous tract a subperiosteal palatal flap containing the anterior palatine artery was provided to close the oroantral fistula (fig 5). A surgical acrylic splint which had been constructed prior to surgery was adjusted and inserted.

The postoperative course was uneventful. The denuded area on the palate was completely epithelized and a satisfactory closure of the oroantral fistula was obtained (fig 6). Roentgenographic examination four months postoperatively, revealed that the rig (fig 4B)



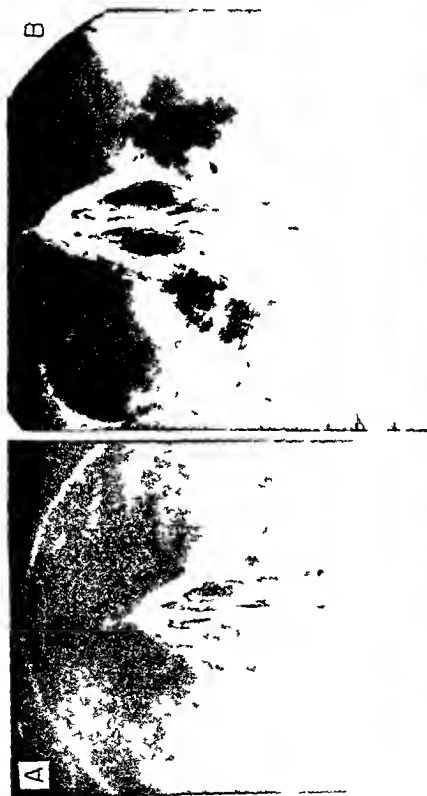


Figure 4 (A) Waters view taken prospectively showing the slowly rising and (B) Waters view taken four months postoperatively showing the rising of right atrium.



*Figure 5 Photograph taken two weeks postoperatively showing the flap over the right maxillary molar area and the denuded area on the palate*



*Figure 6 Photograph taken four months postoperatively showing the successful plastic closure of the oroantral fistula.*

## SUMMARY AND CONCLUSIONS

Changes in atmospheric pressure created during flight may produce undue stress on the antral membrane of an abnormal sinus when it is devoid of bony support

The oral surgeon must be aware of the physical factors encountered during flight which may adversely affect the postoperative course in patients from whom considerable alveolar bone is removed during the extraction of posterior maxillary teeth. In cases where alveolar bone is lost in the vicinity of the antrum, the oral surgeon should obtain roentgenograms to evaluate the sinus. Whenever infection or other abnormalities are noted treatment should be recommended and the patient advised against air travel.

The wisdom of this course is illustrated by a case report which describes the herniation of an antral membrane at the site of a defect in the alveolar bone produced during dental extractions. Infection of the maxillary sinus existed prior to the herniation. If the patient had been warned to avoid air travel the herniation probably would not have occurred.

## REFERENCES

- 1 Campbell P A A r t —resum T *Am. Laryng. A.* 66, 65-86 1944 also *Ann. Ot. l. Rhin. & Laryng.* 54 69-83 Mar 1945
- 2 Armstrong H G *Principles and Practice of Aviation Medicine* 3d edit o The Williams and Wilkins Co Baltimore Md 1952 pp 333-335
- 3 McFarland R A *Human Factors in Air Transportation* McGraw Hill Book Co I N w Yo k N Y 1953 pp 681-682
- 4 Dept of the Air Force *Flight Surgeon's Manual* AFM 160-5 July 1954
- 5 Dept of the Air Force *Physiology of Flight* AFM 160-30 July 1953 pp 51-56.

---

At any stage in the course of scleroderma uraemia may ensue and the patient die in a few weeks or less. This complication of scleroderma is characterised by rapid destruction of renal tissue due to an acute or subacute version of focal and minimal cortical necrosis.

—P J CALVERT M D and T K OWEN M B  
in *The Lancet*  
p 19 7 July 1956

# Priapism of Unknown Cause

EDWARD C. LEWIS II Lieutenant MC USNR

BENJAMIN F. SCHWARCZ M D

**P**RIAPISM is an uncommon and extremely distressing condition which has not been adequately dealt with in the textbooks. It is usually defined as a state of sustained, painful erection without sexual desire. Priapism may be due to a variety of causes which can be grouped into two general categories—nervous and vascular.

It has long been observed that men hanged by the neck develop priapism. This condition has also been seen in injuries of the cervical cord and, as a rare manifestation, of central nervous system disease such as syphilis and multiple sclerosis. In priapism associated with central nervous system disease, the patients have usually developed associated urinary retention due to interference with the nervous mechanism controlling micturition. Priapism due to vascular causes constitutes by far the largest group of cases. Erection is maintained by thrombosis of the venous channels of the penis.

Thrombosis may result from sickle cell anemia, leukemia, carcinomatous infiltration of the corpora cavernosa, and as a result of trauma to the perineum. Priapism in the younger age group is usually the result of leukemia or sickle cell anemia, while in the older age group it is more apt to be due to carcinoma.

The two following cases are unusual because of the absence of an etiologic factor and the prolonged duration of priapism.

## CASE REPORTS

**Case 1** A 40 year old Negro was admitted to this hospital on 22 August 1951 six days after awakening with an erect penis which had failed to subside. He gave a past history of syphilis which had been treated with arsenicals in 1942. On admission to the hospital his penis was erect and tender but he was able to void without difficulty. Examination revealed no significant abnormalities except for the priapism. Both the corpora cavernosa and the corpus spongiosum were involved. Laboratory studies disclosed no evidence of sickle cell anemia. The patient had a quantitative Kahn of 8 units and spinal fluid complement fixation was 3 plus. An intravenous pyelogram and a roentgenogram of

the chest were normal. A roentgenogram of the spine showed hypertrophic arthritis.

The patient was placed on heparin therapy. Ice bags were applied to the penis and two lumbar sympathetic blocks were done without benefit. On the 19th hospital day, which was 25 days after the onset of priapism, the corpora cavernosa were aspirated with a No. 15 gage needle and then irrigated thoroughly with normal saline solution. Prompt improvement occurred and the priapism subsided within 24 hours. Five days later the patient was discharged, at which time the penis had returned to its normal state and he was again having morning semi-erections.

**Case 2.** A 23 year old white male was admitted to this hospital on 19 December 1953 because of priapism of three days duration. He had had a similar episode two years previously lasting only 8 hours. On admission he was able to urinate and had no dysuria but his penis was painful. A review of his past history contained nothing pertinent to the present illness. Positive physical findings were limited to the penis which was erect and painful to touch. Both the corpora cavernosa and the corpus spongiosum were involved in the erection. Laboratory studies including a complete blood cell count, urinalysis, prothrombin and bleeding times and spinal fluid protein, sugar and colloidal gold were within normal limits. The Kahn test and spinal fluid were negative for syphilis. Roentgenograms of the spine and chest revealed normal findings.

The patient was first treated with heparin and Dicumarol (brand of bishydroxycoumarin) in an attempt to prevent further thrombosis. He was also placed on diethylstilbestrol and an ice bag was applied to his penis. This was of no avail and his condition became progressively worse with more pain and tenderness. On the third hospital day he was given a spinal anesthetic and when this failed to relieve his priapism the corpora cavernosa were evacuated through a No. 16-gage needle and irrigated with normal saline solution. Following this procedure priapism gradually subsided and was completely gone by the seventh post-operative day. Three weeks after aspiration the patient was again *having semi-erections in the morning*. A follow up in April 1956 disclosed that he was still having semi-erections and was able to have sexual intercourse. He had had no further episodes of priapism and had not noticed any deformity of his penis as a result of aspiration except for the incompleteness of his erections.

#### DISCUSSION

In the two cases presented the cause of the priapism was not apparent. In the case of the 40 year old Negro patient there was a previous history of syphilis but neurologic examination did not reveal any evidence of central nervous system involvement although the complement fixation test on the spinal fluid was positive. Most of the reported cases of priapism have been found to be secondary to other disease processes. The treatment of

priapism is far from satisfactory. In cases such as the above, where there is no apparent underlying lesion, it seems likely that the priapism begins as a neurogenic problem. Hyperactivity of the parasympathetic system may account for the development of the erection initially and for sustaining it for an unusual period of time. If this were the only factor, however, spinal anesthesia would be expected to produce prompt remission of the condition. This has not been the case. Thrombosis of the venous channels of the penis following prolonged erection occurs fairly early and probably prevents alleviation by spinal anesthesia. Ansbro and associates<sup>1</sup> reported a case of priapism in a patient who received spinal anesthesia continuously for a 14 day period without relief of erection. Most, if not all, cases of priapism have reached the stage of venous thrombosis before they are seen by the physician. The problem is, therefore, one of treating venous thrombosis rather than parasympathetic hyperactivity.

In 1950, Smith<sup>2</sup> reported the first case of priapism successfully treated by Dicumarol, and in 1955 Fraser<sup>3</sup> reported the second case successfully treated with this drug. This appears to be a rational approach to the disease and probably has its greatest application in the early stages of priapism.

Both heparin and Dicumarol were used in our two patients with out apparent benefit. Price and Penn<sup>4</sup> reviewed a large series of cases in which they used diethylstilbesterol in preventing post operative penile erections. Although it is effective in this situation, it appears to exert no beneficial effect in true priapism.

Various other methods of treating priapism have been advocated, such as division of the pudendal nerves, division of the ischioavernosus muscle, and ligation of the dorsal artery of the penis. They are mentioned only to be condemned and are in general mutilating procedures. Sympathetic block would appear to be the incorrect thing to do, because it would further release the sacral parasympathetic outflow whose action is responsible for erection under normal circumstances.

Evacuation of the corpora cavernosa, either by aspiration or incision and drainage, has been demonstrated to be one of the most effective forms of treatment and has been practiced for over a century. This form of treatment is most efficacious in the early stages of the disease, but in the two cases presented proved beneficial on the 25th and on the 6th day of the disease.

The corpora cavernosa should be thoroughly irrigated with normal saline solution at the time of aspiration to remove clotted blood. A No. 15 or No. 16 gage needle works satisfactorily for this purpose.

Although gangrene is not an infrequent complication of aspiration or incision, according to Bailey,<sup>5</sup> no difficulty was encoun-

tered in the patients seen by the authors. Impotence is a common sequela of priapism. In the one patient who was followed to the present time intercourse was possible although the penis would become only semierect. The other patient was having morning erections when he left the hospital but has been lost to follow up study so his ultimate fate is unknown.

### SUMMARY

Priapism, an uncommon condition, may be caused by central nervous system disorders such as injuries of the cervical cord, syphilis, and multiple sclerosis. It also may develop during such vascular disorders as sickle cell anemia, leukemia, and carcinomatous infiltration of the corpora cavernosa.

The pathogenesis of priapism of unknown cause probably includes initially hyperactivity of the parasympathetic nervous system in most instances. Thrombosis of the venous channels of the penis then maintains the erection and prevents alleviation of the condition by spinal anesthesia.

Evacuation of the corpora cavernosa either by aspiration or incision and drainage is one of the most effective forms of treatment, but is frequently followed by impotence. Anticoagulant therapy is helpful in the early stages of this condition.

The two instances of priapism reported in this article occurred in patients who had no apparent causative disease. The condition was relieved by anticoagulant therapy plus aspiration and irrigation of the corpora cavernosa.

### REFERENCES

1. Asher, F. P., Latt, F. S., Blundell, A. E., Swamy, J. J., and Andro, J. E., and Bodell, B. Prolonged spinal anesthesia (7 1/2 and 14 days). *Anesthesiology* 13: 569-571, Sept. 1954.
2. South, A. H. Urologic complications of priapism. *J. Urol.* 64: 400-402, Aug. 1950.
3. Fraser, W. J. Cause of priapism. *Brit. M. J.* 7: 419, Aug. 13, 1955.
4. Price, R. A., and Penna, O. J. Effects of drugs on priapism. *Am. J. Surg.* 24: 980-982, Dec. 1948.
5. Bailey, H. P. Spontaneous priapism. *Brit. J. Surg.* 35: 298-303, Jan. 1948.

# Spontaneous Rupture of the Stomach in Infants

MARCUS & MOORE Sr., Captain, USAF (MC)

**S**PONTANEOUS rupture of the stomach in the newborn infant is a rare condition Herbut<sup>1</sup> summarized 15 cases with spontaneous ruptures from the English literature in 1943. In one case the perforation was proved not to be secondary to gastric ulceration. He reported an additional case with a congenital defect in the musculature of the stomach wall. Other case reports have been added to make a total of 33 cases recorded in the literature.<sup>2-6</sup> Thirteen of these are described as spontaneous rupture of the stomach not secondary to a gastric ulceration. Pondergruss and Booth<sup>7</sup> in 1946 reported an infant with two perforations of the stomach. In 1947 Burnett and Halpert<sup>8</sup> reported rupture of the stomach in an infant with pyloric atresia. Tudor<sup>9</sup> in 1950 described one case of spontaneous rupture in the greater curvature of the stomach. Eight other cases have been reported between 1951 and 1956.<sup>10-12</sup> This report is of an additional case of spontaneous rupture of the stomach in an infant without gastric ulceration.

Although many theories have been proposed as to the cause of spontaneous rupture of the stomach in infants, the definite cause remains obscure. One author regarded the mechanism of the perforation as a local disturbance in circulation to the stomach wall by embolism, thrombosis, vascular disease, nervous influences, or direct injury to the mucous membrane, with subsequent perforation following the action of the gastric juice. Extensive investigative studies have also been performed to demonstrate an imbalance of pituitary hormones as the cause of the spontaneous gastric ruptures in infants.<sup>12</sup> Congenital defect of the musculature of the stomach wall has been described and considered responsible for the perforation.<sup>1, 7, 9</sup> Tudor and others have reported cases in which no defects in the muscular wall of the stomach could be demonstrated. One patient reported by Ross, Hill, and Haas<sup>10</sup> had a perforation of the stomach with necrosis of the wall, possibly due to intramural hemorrhage.



## CASE REPORT

A five-week old white male infant was rushed in critical condition to the pediatric service of this hospital from a dispensary station of an Air Force base about 50 miles distant on 28 March 1956. Twelve hours prior to admission the infant became acutely ill and had abdominal distention, shallow respirations and cyanosis. He was listless and had an ashen gray color. The infant had a history since birth of periodic episodes of illness characterized with vomiting, hematemesis, melena, poor feeding habits and apparent abdominal pain. He was born after a normal gestation period and an uncomplicated delivery. His mother was a 23 year-old multipara in apparent good health and he had two normal siblings. The infant had been seen at the dispensary station on four previous occasions.

Physical examination on admission revealed a cyanotic infant with a markedly distended abdomen and shallow respirations appearing to be at the very point of death. He responded to immediate emergency therapy of parenteral fluids with electrolytes, antibiotics, hydrocortisone, whole blood and oxygen. Preoperative fluids—approximately 200 ml of normal saline solution in 5 per cent dextrose solution mixed with 60 ml of 1/6 per cent molar lactate containing 100 mg of hydrocortisone and 250 mg of Terramycin (brand of oxytetracycline)—were given intravenously through an emergency venisection and polyethylene tube cannulation of the left ankle. One hundred and fifty milliliters of whole blood was begun as transfusion preoperatively and continued through the surgical procedure. Immediate laboratory studies were made of the patient's blood and urine. Erect and lateral roentgenograms of the abdomen (figs 1 and 2)



Figure 1. Roentgenogram of the abdomen taken in the erect position, demonstrating gas free in the peritoneal cavity under the diaphragm. Figure 2. Roentgenogram taken in the lateral recumbent position, demonstrating pneumoperitoneum.

demonstrated free gas under the diaphragm with a markedly distended gastrointestinal tract. A diagnosis was immediately made of pneumoperitoneum from a ruptured hollow viscus.

February 1977

CASE REPORT—FL 1245 (1)

An emergency operation for intestinal obstruction was performed. The stomach was found to be dilated and the pylorus was closed. The stomach was found to be dilated and the pylorus was closed. The stomach was found to be dilated and the pylorus was closed.

The infant's immediate response to surgery was poor. Therapy included continued gastric decompression and transfusions plus administration of antibiotics. Twelve hours following operation the infant had convulsions, his condition deteriorated and he died on the first postoperative day.

An autopsy performed a total gastrectomy revealed a massive peptic ulcer with all the ulcerated area covered by a thick plastic eschar. The ulcer was not amenable to surgical repair (Fig. 3) was found to be a result of ruptures or obstructive lesions in the duodenum.



Figure 3 Photograph of the stomach after pyloromyotomy. The line in the greater curvature demonstrates the ulcer.

examination of the borders of the rupture demonstrated the mucosa to be hemorrhagic with a moderate amount of acute inflammatory infiltration into the submucosal areas. There was normal development of all layers of the gastric musculature.

Because the generalized peritonitis in this case was due to a rupture of the stomach with profuse spillage of gastric contents all over the peritoneal cavity it was impossible to isolate any one organism as being responsible. It could be classified as a chemical peritonitis.

### DISCUSSION

Although rupture of the stomach in infants is rare prompt treatment can be lifesaving. The importance of making the diagnosis in an infant is considerably greater than in an adult for if left untreated surgically the infant practically always succumbs. Unfortunately the majority of the cases are not recognized clinically in the early stages and usually are diagnosed only after perforation of the stomach or development of peritonitis. Seven of the 33 patients reported have survived operation.

### SUMMARY

Thirty three cases of spontaneous rupture of the stomach in newborn infants have been recorded in the literature. Thirteen infants have been described with ruptures of the stomach not secondary to gastric ulceration. Another case is herein reported of spontaneous rupture of the stomach in a five-week old infant. There are seven surgical survivals reported in infants.

### REFERENCES

- 1 Hrbur P A C. *General defect in muscularity of the stomach in newborn infant*. *Arch Path* 36 91 94 July 1943
- 2 Plummer G W and Stabins S J. *Blind duodenal ulcer in infancy: gastric perforation reported in two cases treated surgically by surgery*. *J Pediatr* 37 899-904 Dec 1950
- 3 Wright L T and Scott B E. *Perforated stomach in newborn infant*. *Arch Path* 37 905-908 Dec 1950
- 4 Kellogg H G. *Abel N S M and Co well F A. Perforation of the stomach in infancy: report of survival*. *Am J Surg* 39 357-362 Sept 1951
- 5 Battelle J W. *(Oklahoma City) and B. H. A. E. Perforation of the stomach in infancy: report of survival*. *Am Surgeon* 18 1146-1149 Dec 1952
- 6 Moncrieff W H Jr. *Perforated stomach in newborn infant: report of survival*. *Am Surg* 139 99-102 Jan 1954
- 7 Bleding Ann. *Surg* 139 99-102 Jan 1954
- 8 Burnet H A and H. L. P. *Report of a ruptured stomach in infancy and childhood: report of survival*. *Am Surg* 139 99-102 Jan 1954
- 9 Tundo R B. *(Fas N D) Perforation of the stomach in infancy and childhood: report of survival*. *Am Surg* 139 99-102 Jan 1954
- 10 Ros M (Sa M) H. L. P. *Perforation of the stomach in infancy and childhood: report of survival*. *Am Surg* 139 99-102 Jan 1954
- 11 Greene W W. *(Kansas City Mo) and Gos D F. Perforation of the stomach in infancy and childhood: report of survival*. *Am Surg* 139 99-102 Jan 1954
- 12 Keeser W B. *Spontaneous rupture of the stomach in newborn infant*. *Am J Dis Child* 85 162-167 Feb 1956

# Kartagener's Syndrome

RICHARD FOULK *Commander MC USN*

**K**ARTAGENER'S syndrome or triad consists of situs inversus, bronchiectasis, and chronic sinusitis. To date, less than 100 cases have been reported in the literature, which indicates the rarity of this condition. The pathogenesis is unknown, but various theories have been proposed. Bergstrom and others<sup>1</sup> stated that the changes noted in the lungs may be a structural defect of the respiratory epithelium causing a predisposition to infection or an altered secretory activity of the bronchial mucous membrane. Olsen,<sup>2</sup> in reviewing the causes of bronchiectasis associated with dextrocardia, agreed that an maldevelopment of the bronchial walls may be the primary factor in the pathogenesis of the bronchiectasis.

At the Mayo Clinic during the period from 1920 to 1941, 85 patients had true dextrocardia with complete transposition of all viscera. Fourteen of these patients had bronchiectasis and 10 of the 14 had diseased sinuses. Adams and Churchill<sup>3</sup> found a 0.03 per cent incidence of this triad in a large hospital. It has been recommended by some authors<sup>4</sup> that all children with dextrocardia and frequent upper respiratory tract infections should have studies to rule out bronchiectasis and sinus infection so that they may be treated early before marked damage has occurred. Antz and others<sup>5</sup> recommended that the families of such patients be screened because there is a familial incidence of this disease. This is noted in the report by Bergstrom and others,<sup>1</sup> in which 2 of 6 siblings had Kartagener's syndrome, 2 had bronchiectasis and sinusitis, and 2 were normal. Two of the five children observed by Dickov<sup>6</sup> were siblings, and all had necrotic tasis accompanying the usual triad.

The treatment is not presently symptomatic and consists of postural drainage, antibiotics as needed, and routine care of sinusitis as required. Depending on the extent of bronchiectasis, lobectomy or segmental resection may at times be indicated.

## CASE REPORT

A 17 year old white woman was admitted to this hospital on 15 August 1955 with a chief complaint of a chronic cough which produced 2 to 3

---

From U S Naval Hospital Memphis Tenn. Comdr Foulk is now assigned to U S Naval Hospital Navy No 3923 FPO San Francisco Calif.

ounces of fetid yellowish green sputum daily. The cough was more severe and productive on arising in the morning and subsided somewhat during the day. She had attacks of wheezing and dyspnea on hot damp days. No history of hemoptysis could be obtained. These symptoms had been present intermittently over the past 12 years. From the ages of 10 to 15 years she had repeated attacks of pneumonia in one or the other of the lower lobes. Frontal headaches had occurred during this same period with an increase in nasal discharge at times. No bloody nasal discharge had been present.

Menarche occurred at 13 years of age and menses had been regular every 30 days lasting five to six days. Her weight had been steady at 110 pounds. In 1954 the patient had an appendectomy at which time the appendix was found to be on the left side. She had pyelonephritis shortly after her marriage in March 1954 and again in August 1955 two weeks prior to admission. The history was otherwise negative except for the common childhood diseases and a chronic blepharitis.

Her mother was living and well. Her father had died at the age of 34 with asthma and bilateral pneumonia. No history of dextrocardia in the father was known. Two brothers and one sister were living and well.

**Physical Examination.** On admission the blood pressure was 105/60 pulse 85 per minute and temperature 98.6 F. A mild blepharitis involved both eyes. The nasal mucous membrane was red and edematous and it was noted that the upper nasal region was widened. The sinuses especially the frontal were visualized with difficulty. Ophthalmoscopic examination was within normal limits. Examination of the lungs revealed crepitant rales in both bases anteriorly and posteriorly which cleared on coughing.

The apex of the heart was found to be in the midclavicular line on the right side of the chest. No abnormalities of the abdomen were noted except that on percussion the liver appeared to be on the left and the spleen on the right. Neither was palpable. The patient's voice was nasal and coarse.

**Laboratory Studies.** A white blood cell count was 10,700 per  $\mu$ l with 65 per cent neutrophils and 35 per cent lymphocytes. Hemoglobin was 12.5 g/100 ml. The urine was normal on examination. Several cultures of the sputum produced no pathogenic bacteria. Roentgenograms of the chest revealed changes in the lower lobes of both lungs which were compatible with bronchiectasis (fig 1). Dextrocardia was present and fluoroscopic examination of the abdomen revealed situs inversus. Bronchoscopic examination revealed diffuse reddening of the trachea and large amount of greenish yellow secretion was noted coming from almost all bronchial orifices and especially from those of the lower lobes. A bronchogram revealed bronchiectasis in the right lower lobe which would be the "right lingula" of the right upper lobe in the left lower lobe and the "left middle lobe" (fig 2). The electrocardiogram was typical of dextrocardia (fig 3). Roentgenograms of the sinuses

revealed a diffuse cloudiness of the ethmoids, antrum, and rudimentary frontal sinuses (fig. 1)



*Figure 1 Roentgenogram of the chest showing dextrocardia.*

**Treatment and Course** The patient was treated with postural drainage for 10 minutes 4 times a day 250 mg of Terramycin (brand of oxytetracycline hydrochloride) every 6 hours Benlyn Expectorant for cough a nutritious diet and other supportive measures. The amount of sputum decreased from two to three ounces daily to approximately one half ounce daily while the patient was on this regimen however, subcrepitant rales were still present in both bases on discharge. She has been followed as an outpatient with very little improvement in her condition. She has not co-operated very well in doing her postural drainage, however no known acute infections have been noted since her discharge from the hospital on 24 August 1955.

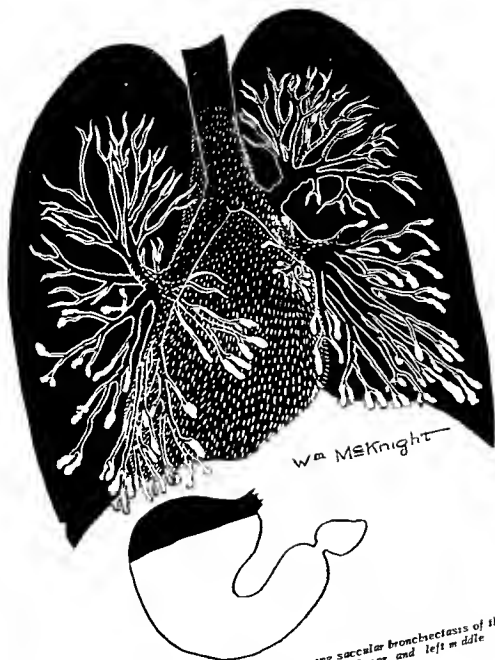


Figure 3. Diagram of bronchogram showing saccular bronchiectasis of the right lower, right lingulae of the right upper, left lower and left middle lobes.

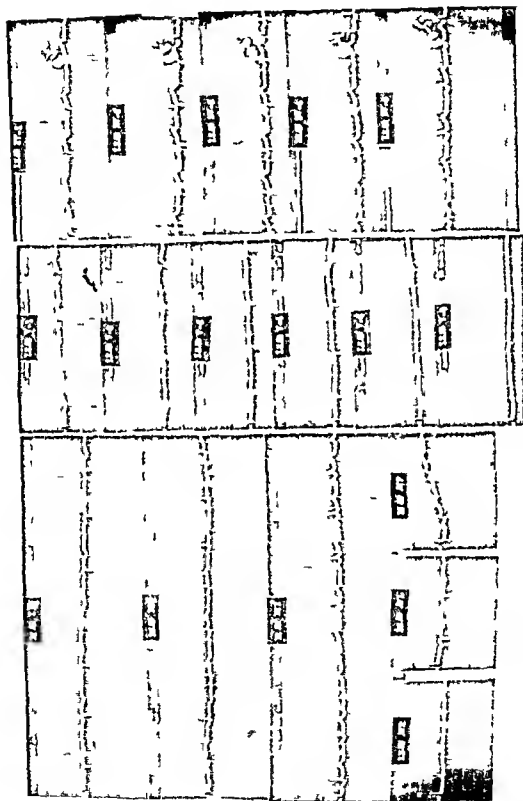


Figure 3 Electrocardiogram of patient with changes typical of dextrocardia.





Figure 4 Roentgenogram of paranasal sinuses

#### REFERENCES

- 1 Bergstrom W H Cook C D Sann H J G and B nberg W Srus i t us  
bron h cta and s us r s rep rt of famly with 2 s s of Kart g n r d and 2  
addr n l ca es f bronch cta am ng 6 s bl ng Pediatrics 6: 573-580 Oct 1950
- 2 Olsen M Bouch crasis and d str card a b r r n n r ol gy of bron h  
rasis Am Rev Tuberc 47 435-439 Apr 1943
- 3 Adams R and Churchill E D Srus in e sus s us r s d bronch cta s re  
port of 5 as includ ng f equen y t u t cs J Thoracic Surg 7: 206-217 Dec 1937
- 4 Zuck rma H S nd Wurtz ba h L R Kart g n s trid tev w fltr rure  
d ept r of ca Dis Chest 19 92-97 J n 1951
- 5 Ka M (N w Y rk) B n r t E E Na get n L nd Sussman B K rtag ner s  
syndr m ( r us nv sus h ach cta nd bron c nus r ) r p r r f cas New  
England J Med 248: 730-731 Apr 23 1953
- 6 Deck y L B Kartag n syndr m n child n Dis Chest 23 657-666 Jun  
1953

## Departments

### A MESSAGE FROM THE A M A

One of the most significant legislative proposals affecting the medical profession in recent years was signed by the President on 7 June 1956, thereby becoming Public Law 569 of the 84th Congress. This law authorizes the Federal Government to assume responsibility for the medical care of dependents of the uniformed services. Because of the law's importance and the many problems it poses for the medical profession, a brief review of the interest and activities of the American Medical Association concerning this subject is being reported this month as a matter of general interest to physicians.

In 1953 the Moulton Commission reported its findings and recommendations with respect to dependent medical care. The A M A opposed the Commission's major recommendations, as well as the subsequent bills which were introduced to implement them. Briefly, the A M A took its position on the grounds that the legislation would result in a big expansion of the military hospital establishment and the continuation of the doctor draft. In December 1954 the House of Delegates of the American Medical Association voted that, "If it is to be the policy of the Government to provide for medical care for dependents of service personnel, the services of civilian physicians and hospitals be used whenever possible, to be paid for at prevailing rates with provision for free choice of physician."

In 1955 Congress shifted its position and developed legislation emphasizing utilization of civilian physicians. In January 1956 witnesses testified on behalf of the American Medical Association before a Subcommittee of the Committee on Armed Services of the House of Representatives. These witnesses urged that if Congress saw fit to provide additional medical care to dependents "increased emphasis should be placed on the utilization of civilian facilities and the services of civilian physicians." It was pointed out, also, that such a program would reduce the requirements of the Armed Forces for physicians and obviate the necessity for any further extension of the "Doctor Draft Law." The Association, recognizing that many problems would necessarily follow the enactment of a program of this type, pledged its support and complete co operation.

---

From the Council on National Defense of the American Medical Association. The views and opinions expressed are not necessarily those of the Department of Defense.  
—Editor

After the bill became law the House of Delegates of the American Medical Association on 11 June 1956 adopted a resolution urging all medical associations to co operate with the Department of Defense "in the provision of medical services to the dependents of servicemen utilizing such insurance, medical service or health plan or plans as encompassed by the law A plan or program for any given geographical area should first be approved by the organized medical profession of that area At the same time the House also directed the Board of Trustees to initiate direct liaison with the Department of Defense and render all reasonable and effective aid and assistance to state and county medical societies toward implementation of the act

Pursuant to this direction the Board of Trustees thereupon appointed a special Task Force on Dependent Medical Care and a series of conferences between this Task Force and the special Task Force of the Department of Defense immediately began to iron out the many problems and issues involved in setting up the program

On 28 29 July 1956 a meeting of representatives of constituent medical associations was called by the A M A at which time the medical care program was discussed At this meeting held in Chicago representatives from the Department of Defense outlined their plans and answered many questions The conference recommended that the constituent medical associations (a) co operate with the Department of Defense in promoting the program (b) determine if they would prepare a schedule of allowances for the reimbursement of physicians for medical services on a state or area basis and (c) indicate preferences for the contracting agent and fiscal administrator

Several meetings were then held by A M A representatives and the uniformed services to consider the nature of the contract between the Government and the contracting agent and fiscal administrator The A M A endeavored to achieve acceptance of a contractual format which would be reasonable and protect the traditional physician patient relationship A M A conferees also sought particularly to maintain local traditions and customs and promote a flexible program that could be activated without creating unnecessary problems Following these meetings draft copies of a contract were prepared and sent to all of the constituent medical societies on 16 October

On 20 October an office in the Main Navy Building at Washington D C was assigned by the Army for use by the American Medical Association For approximately one month during the period of contract negotiations representatives of the Association were available for consultation with representatives of the Armed Forces and the various constituent medical societies Since the June 1956 meeting of the House of Delegates the A M A

Task Force and its special committee have maintained continuous contact with the appropriate committees of the uniformed services in an effort to promote the best possible implementation of the Dependents' Medical Care Act.

In its report to the House of Delegates on 27 November 1956, the Board of Trustees said, "It is obvious that this program through which the Federal Government is purchasing medical and hospital care from private sources for selected dependents of servicemen carries with it some danger to the private practice of medicine. Constant vigilance will be necessary to prevent any significantly adverse effect on the practice of medicine."

At its most recent meeting in Seattle, the House of Delegates recognized the assistance and efforts of the American Medical Association to the Federal governmental agencies and the state medical societies in the negotiations of contracts under the dependent medical care program and urged that this guidance continue in the future, so that problems between the Government and state medical societies may be resolved on an equitable and ethical basis.

The American Medical Association, throughout its dealings with governmental departments and medical societies on this important program, has been guided by the philosophical axiom, "Coming together is a beginning, keeping together is progress, working together is success."

---

## DEATHS

BARHAM Roy Irving, Lieutenant Colonel MSC USA of Los Angeles, Calif. stationed at U S Army Hospital Fort Ord Calif, commissioned a Warrant Officer (junior grade) on 15 December 1942 and Second Lieutenant on 16 May 1943 died 10 December 1956, age 41 at U S Army Hospital Ft Ord of carcinoma of the lung with metastases to brain and liver.

HOLLIS George Beacham Major, MSC USAR of Atlanta Ga. stationed at U S Army Hospital, Fort MacArthur, Calif. commissioned a Second Lieutenant in the Army of the United States and ordered to active duty 25 November 1942 died 13 November 1956, age 44 at U S Army Hospital Fort MacArthur, of coronary occlusion.

ROGERS Owen Edgar Lieutenant junior grade, MSC USAR of New Braunfels Tex. stationed at U S Naval Hospital, Pensacola, Fla. graduated in 1952 from Idaho State College and in 1954 from the University of Utah ordered to active duty 16 August 1954 and commissioned an Ensign 15 December 1954 died 19 November 1956 age 26 at U S Naval Hospital Philadelphia Pa. of acute myelogenous leukemia.

## THE WORLD WIDE ROUNDS OF THE AIR FORCE PHYSICIAN

An oil painting depicting a flight surgeon as he makes his rounds somewhere in the Middle East was presented to Major General Dan C Ogle Surgeon General of the Air Force on 12 December 1956. The painting entitled New Country Doctor Makes World Wide Rounds is one of a series used by Douglas Aircraft Company Inc Santa Monica Calif to stimulate the interest of young people in work being done by members of our armed services.

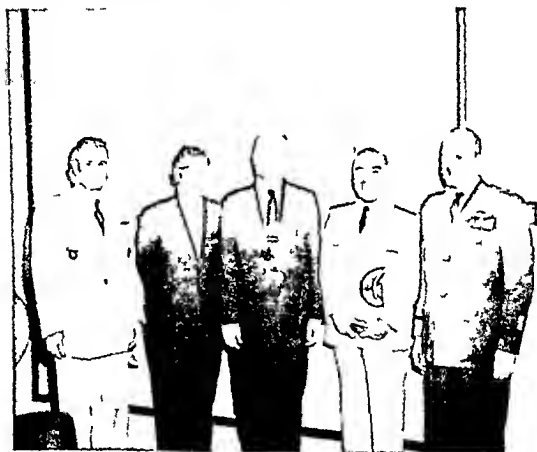


Left to right General Ogle Major General William H Powell Jr Deputy Surgeon General U S Air Force Mr L E Tollefson, Washington D C representative of the Douglas Company and his assistant Mr S W Cebuhar

The message read in part U S servicemen—in their most remote arctic or tropic outposts—are often closer to medical care than their relatives in isolated areas back home thanks to the work of Air Force aeromedical evacuation units. Trained medical personnel and equipment can be raced by air within hours to almost any spot in the world to treat or evacuate patients.

## NEW AIR FORCE HOSPITAL IN LIBYA

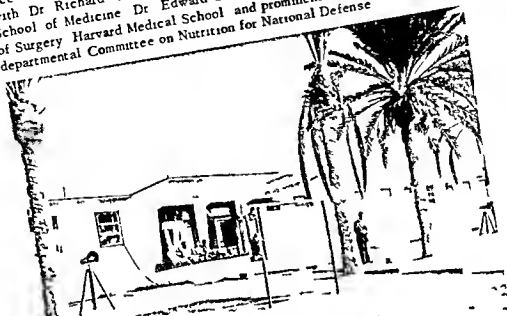
The ever expanding facilities of the Armed Forces overseas were highlighted on 17 November 1956 when the new 7272d U S Air Force Hospital was dedicated at Wheelus Air Base near Tripoli Libya. By good fortune and good timing the dedication ceremony was graced by the presence of a dozen top ranking military and civilian doctors who visited Tripoli on the final leg of a four-week nutrition study through 10 Middle and Near Eastern countries.



Nutrition survey group arrive in Libya for dedication of the new U S Air Force Hospital Wheelus Air Base. From left to right: Colonel Herbert H. Kerr USAF (MC) Major General James O. Gillespie MC USA Dr. Frank B. Berry Rear Admiral Bartholomew W. Hogan Major General Harry G. Armstrong USAF (MC)

Dr. Frank B. Berry, Assistant Secretary of Defense (Health and Medical) headed the group and added one more hospital to the world wide list of dedications in which he has participated as key speaker. He was introduced by Colonel Herbert H. Kerr USAF (MC) Surgeon of the 17th Air Force, who also presented the Honorable John L. Tappin

United States Ambassador to Libya and Major General Harry G. Armstrong, Surgeon General of the United States Air Forces in Europe, Rear Admiral Bartholomew W. Hogan, Surgeon General of the United States Navy, and Major General James O. Gillespie, Chief of Professional Division of the Office of the Surgeon General, Department of the Army, were present along with Dr. Richard A. Kern, Professor of Medicine, Temple University School of Medicine, Dr. Edward D. Churchill, John Homans Professor of Surgery, Harvard Medical School, and prominent members of the Interdepartmental Committee on Nutrition for National Defense.



The Honorable John L. Tappin, Ambassador from the United States to the Kingdom of Libya, speaking at the dedication of the new 150-bed U.S. Air Force Hospital at Wheelus Air Base, Tripoli, Libya.

The new hospital is a 150-bed one-story structure adapted from standard plans developed in the Department of Defense. It is completely air conditioned and offers virtually all the latest diagnostic and treatment facilities. When fully staffed and tied in with a wide spread air evacuation system, it will serve members of the U.S. Armed Forces and their families from Morocco to the Burma border. Wheelus Air Base itself is the Headquarters of the 17th Air Force, which is charged with complete logistic support for this vast area. Comprehensive medical service is a major part of this mission.

# OFFICERS CERTIFIED BY SPECIALTY BOARDS

## Supplementary Listing

According to information from the Office of the Surgeon General, U S Air Force, the following regular Medical Corps Officers have been certified by the boards indicated since the listings published in previous issues of this *Journal*

### American Board of Pediatrics

Thomas M Holcomb Maj USAF      Allen S. Weed Maj USAF

### American Board of Orthopaedic Surgery

George H Chambers Lt Col USAF      John A Hennecan Jr Maj USAF  
James H Dobyns Maj USAF      John W Payne Maj USAF

### American Board of Dermatology and Syphilology

Henry L Hines Capt USAF      Robert Levine Maj USAF

### American Board of Radiology

Claude D Baker Maj USAF      Charles L Randolph Jr Capt USAF  
Neil E Crow Capt USAF      Charles C Watta Jr Maj USAF  
Warren A Nafis Maj USAF

### American Board of Urology

Fetris E Cook Jr Maj USAF

### American Board of Obstetrics and Gynecology

Fred A. Heimstra Col USAF

### American Board of Internal Medicine

Glenn D Baird Maj USAF      Nestor M Hensler Maj USAF  
James E Cassidy Capt USAF      Wilbur L Kenoyer Maj USAF  
Richard H Ferguson Maj USAF      Robert J Solomon Capt USAF  
James H Hammond Col USAF      Robert B Stonehill Maj USAF  
Donald M Haskins Maj USAF

### American Board of Pathology

Robert W Mortissey Maj USAF

### American Board of Surgery

Jack B Jay Maj USAF      Phas S Preston Maj USAF  
Alvin S Natanson Capt USAF

### American Board of Plastic Surgery

John K Quallivan Capt USAF



## American Board of Preventive Medicine\* Public Health

Max B McQueen Col USAF

Hugh W Randel Maj USAF

### Aviation Medicine

Louis B Arnold Col USAF

Stanley Lutz Jr Maj USAF

Ferdinand Barnum Maj USAF

Charles B Marshall Jr Maj USAF

Bruce H Bennett Lt Col USAF

Earl Maxwell Brig Gen USAF

Jack Bollerud Col USAF

Charles K Morris Col USAF

Franklin L Bowling Maj USAF

Harold A Myers Col USAF

John E Boyen Col USAF

Sam E Nely Maj USAF

Thomas A Collins Lt Col USAF

Herman S. Parikh Jr Maj USAF

John R Copenhagen Brig Gen USAF

Joseph M Quashnock Maj USAF

Thomas H Crouch Col USAF

Hugh W Randal Maj USAF

James M Davis Lt Col USAF

Burt Rowen Lt Col USAF

Paul V Davis Lt Col USAF

Hartwin A. Schultz Col USAF

William K Douglas Maj USAF

Samuel O Smelley Lt Col USAF

James G Espy Jr Col USAF

Larry A Smith Col USAF

George H. Felt Col USAF

Ralph E. Switzer Col USAF

Donald L. Ferra Col USAF

Charles H. Talbot Lt Col USAF

F. Whitney Hall Col USAF

William R. Turner Maj USAF

Audrey L. Johnson Col USAF

Eugene E. Van Vleet Jr Maj USAF

Andrew I. Karstens Lt Col USAF

Henry C. Wallace Col USAF

William T. Kiley Lt Col USAF

Stacy C. White Maj USAF

Paul H. Lance Col USAF

Hayden Withers Col USAF

### Board of Thoracic Surgery

(A Subsidiary Board of the American Board of Surgery)

Frederic E. Foley Lt Col USAF

Certificates in Occupational Medicine are available at present and will be published in a later issue

### THE NPN TEST

No laboratory procedure should ever be considered as a routine measure. A nonprotein N or blood urea N test should be made on the blood of any patient who has albumin in his urine, progressive hypertension, evidence of arterial damage in his eyegrounds, or in any case of definitely enlarged prostate. Otherwise this test should be done only when there is a definite indication that it might be of value in the patient's illness. In health examinations at yearly intervals it may be done on the first examination, not repeated unless for definite reason.

—JAMES M. NORTINGTON, M.D.  
in *Clinical Medicine*  
p. 11 Jan 1955

## MILITARY MEDICO-DENTAL SYMPOSIUM

The Fifth Annual Military Medico Dental Symposium under the auspices of the Commandant, First Naval District, will be held at the U S Naval Hospital, Chelsea Mass, and civilian institutions in Boston, Mass 20 to 22 March 1957. The three-day program will have as its theme "The World-Wide Significance of the Preventive Aspects of Military Medicine and Dentistry."

The meeting on the first day will be conducted at the U S Naval Hospital. The second day, a tour of the School of Public Health of Harvard University will be conducted by Doctor John C Snyder, Dean of the School, following which lectures will be given at the Jimmy Fund Auditorium. Lectures on the third day will be held at the Jimmy Fund Building, the Joslin Auditorium at the New England Deaconess Hospital, and the U S Naval Hospital.

Among the prominent guests and speakers on the opening day will be the Honorable Frank B Berry Assistant Secretary of Defense (Health and Medical), Rear Admiral Bartholomew W Hogan Surgeon General of the U S Navy, Major General Silas B Hays, Surgeon General of the U S Army, Doctor Howard Root President Massachusetts Medical Society, Captain Shields Warren, MC USNR Professor of Pathology Harvard Medical School, Doctor Chester S Keefe Director, Boston University School of Medicine, and Agnes Ohlson R N, President American Nurses' Association. Captain R Cannon Eley, MC, USNR Chief of Isolation Service Children's Hospital, and Assistant Clinical Professor of Pediatrics, Harvard Medical School, is serving as general chairman of the Symposium.

The Symposium has been approved for retirement point credit for those in attendance who are on the Active Status List in the Armed Services Reserve program, provided they register with the authorized military representative assigned the duty of recording daily attendance. Programs and additional information may be obtained by writing to the District Medical Officer First Naval District, 495 Summer Street, Boston 10 Mass.

## MEDICAL OFFICER ELECTED PRESIDENT OF BOARD OF PSYCHIATRY AND NEUROLOGY

Captain George Neely Raines MC USA was elected President of the American Board of Psychiatry and Neurology during the annual meeting of the Board in New York 9 to 11 December 1956 Captain Raines is the first military medical officer on active duty to be elected to this position He served as a Director of the Board since 1949 and was its Vice President last year



Captain Raines is on duty at the Bureau of Medicine and Surgery Washington D C as Head of the Neuropsychiatry Branch and is Professor and Director of the Department of Psychiatry at Georgetown University School of Medicine

## Reviews of Recent Books

THE PRACTICE OF MEDICINE edited by Jonathan Campbell Meakins C B E M D, LL D D Sc 6th edition 1916 pages 318 illustrations including 4 in color The C V Mosby Co St Louis Mo, 1956. Price \$16

This sixth edition of Meakins' *Practice of Medicine* bears little resemblance to the preceding five editions. Whereas this book was previously produced by Dr Meakins with a few chapters credited to four or five of his colleagues the current volume represents a coordinated effort by 24 associate editors and 87 contributors from medical educational and research centers in 21 states and the District of Columbia in addition to Montreal, Canada, and Cardiff Wales.

The 214 chapters are organized into 22 sections, four of which pertain to specific infections due to bacteria, viruses, spirochetes, and rickettsiae. Included also are the chemotherapy of infection, the allergic states and diseases due to abnormal environment, and a final section on the psychosomatic aspects of medicine. Most sections are preceded by an introduction containing general facts and principles pertaining to all diseases in that group. Several sections (notably those on cardiovascular, renal, pulmonary and hepatic diseases) devote considerable space to basic physiologic, chemical and anatomic considerations that greatly enhance an understanding of the section as a whole.

Although the number of pages has been increased from 1558 to 1916 and illustrations reduced from 518 to 318 the presentation of many subjects is quite brief. This is no reflection on the quality of the book but rather an indication of the great advances which have been made in our knowledge of medicine and the difficulty which coverage in a single volume entails. The greatest space is generally allocated to conditions of greatest frequency and importance. The illustrations included are excellent, the text is clear and readable and the references though restricted in number, are well chosen. This book is recommended as a valuable addition to the armamentarium of medical students, general practitioners and internists alike. —ALBERT A BIEDERMAN, *Col. W. C. C.*

ANGIOCARDIOGRAPHIC INTERPRETATION IN CO GE'ITAL EASE by Herbert L. Abrams, M D and Henry S. J. L. M. D. Monograph in The Bannerstone Division of American Lectures in Pediatrics edited by John A. Anderson M D 233 pages 1956. Price \$11. Thomas Publisher Springfield, Ill 1956. Price \$11.

This publication is an excellent monograph in The Bannerstone Division of American Lectures in Pediatrics. The case reports are from a series of over 350 angiocardio-graphic studies.

congenital heart disease most of which examinations were performed in children under the age of three

Part 1 summarizes the historical background of angiocardiology the techniques contrast media and roentgen equipment employed reactions to angiocardiology general principles of interpretation and the role of aortography in diagnosis Part 2 is divided into 27 sections each dealing with one or more specific congenital anomalies These sections stress particularly the interpretation of the differential diagnostic features apparent in contrast roentgen studies No attempt was made to describe in detail the clinical physiologic pathologic and surgical data except insofar as seemed necessary to clarify the angiocardio-graphic anatomy

In each section variable emphasis is given to electrocardiographic and roentgenographic characteristics in addition to either angiocardio-graphic or aortographic findings The book is profusely and adequately illustrated with excellent reproductions of angiocardio-graphs which are accompanied in each instance by labeled easy-to-read diagrammatic sketches In the appendix there is a short useful three-page reference table of differential diagnosis

The authors have been unusually successful in their efforts to bring into focus the role of angiocardiology in congenital heart disease They have accurately described and portrayed the diagnostic patterns which have merged up to this time in the summary of their and others' experiences in evaluating the usefulness of contrast roentgen studies in congenital heart disease This book is highly recommended for inclusion in the library of all physicians interested in the diagnostic evaluation of congenital cardiovascular anomalies —GEORGE C. BESS Col USAF (MC)

**TREATMENT OF THE CHILD IN EMOTIONAL CONFLICT** by Hyman S Lippman M D 298 pages The Blakiston Div. McGraw-Hill Book Co Inc New York N Y 1956. Price \$6.

Dr Lippman has drawn upon more than 25 years of experience with disturbed children to write a book which will be of interest primarily to psychoanalytically oriented therapists However portions of his book may be recommended to a much broader audience

In the section devoted to "approaching therapy" Lippman briefly describes the division of therapeutic labor among the members of the "psychiatric team" in a child guidance clinic He gives a simple straightforward exposition of the necessity for eliciting the co-operation of the family of the "emotionally conflicted" child in order to guarantee maximum effectiveness of therapy and minimum anxiety for the child Pediatricians teachers personnel of juvenile courts welfare agencies and others whose duties require them to initiate or advise on referrals of children to guidance clinics will find this discussion of significant interest

The second major portion of this book details a broad array of mental and emotional disturbances in children with the primary emphasis

given to the treatment of the various well chosen cases described. In addition, a brief, annotated bibliography devoted specifically to "the psychotic child" will be welcomed by readers especially interested in that subject. The chapters on "the psychopath" and "the neurotic delinquent" were especially impressive because of the author's manifest patience and optimism in approaching these vexing cases.

However, the reader who does not share Lippman's Freudian orientation will probably object strenuously to his apparently uncritical deification of the id-ego-superego trichotomy as though it were *factual* rather than *conceptual*. The book might have been greatly improved by occasional references to alternative and, at least, equally plausible explanations of the dynamics of the various emotional disturbances discussed.

The final portion of the book deals briefly with the problem of prevention and some principles of therapy, the latter section being somewhat hortatory, but justifiably and acceptably so.

One wishes that specific attention had been devoted to the widespread existing mental health education and information programs. Many of these programs involving substantial investments, are devoted to fostering secure, healthful relationships within the family which Lippman describes as "the most valuable unit in any program for preventing emotional conflict in children."—NORMAN A. HILMAR Capt. MSC USA

**UROLOGICAL SURGERY**, by Austin Ingram Dodson M. D. F. A. C. S. with nine contributors. 3d edition. 868 pages. 664 illustrations. The C. V. Mosby Co. St. Louis Mo. 1956. Price \$20.

The third edition of this book maintains the high standards set by the first two editions. In keeping with the rapid advances in urologic surgery, new and in general excellent material has been added on post-operative urinary incontinence, neurologic uropathy, stress incontinence in the female, and perineal prostatectomy. The chapter on the adrenal glands has been revised, as has the section on uretero-intestinal anastomosis. To make room for these revisions, certain chapters appearing in the second edition have been deleted without materially detracting from the overall value of the book. These include the chapters on radiation therapy, acid base balance, and blood transfusions. The latter two are included more appropriately in a section on pre- and post-operative care.

Although the book reflects a genuine attempt to maintain a degree of completeness and up-to-dateness which is all too often lacking in works of this type, criticism might be levied at the omission of a description of the transthoracic approach to the kidney, a procedure which would seem to be definitely entrenched in the surgical armamentarium, and of the use of isolated segments of small and large intestine as urinary conduits. The latter procedure, although admittedly a rather recent innovation, seems deserving of more than one or two sentences. The section on ureterocystostomy is excellent, but the procedure is not included. On page 61 appears the

presacral oxygen insufflation air embolism is almost unknown This is misleading The statement on page 731 that very little if any pathologic change takes place in the undescended testicle before puberty will certainly find dissenters

Minor criticisms notwithstanding this book is the most outstanding treatise on the subject in the English language The printing paper and illustrations are excellent and this volume should find a place of distinction on the bookshelves of all those engaged in surgery of the urinary tract and male reproductive system

—HOWARD POLLACK Capt USAF (MC)

Proceedings of the Round Table on LYSERGIC ACID DIETHYLAMIDE AND Mescaline in Experimental Psychiatry Held at the Annual Meeting of the American Psychiatric Association Atlantic City N J May 12 1955 Edited by Louis Cholden M D Chairman 85 pages illustrated Grune & Stratton Inc New York N Y 1956 Price \$3

This 81 page monograph reports the panel discussions held on this subject at the 1955 Annual Meeting of the American Psychiatric Association The participants represent some of the most fertile and imaginative research minds in the field of American and European psychiatry Also included are the stimulating comments on mescaline effects by that erudite man of letters Aldous Huxley The focal point is the production of an artificial psychosis by means of LSD 25 The means by which such minute doses of this drug produces symptoms is discussed and it is concluded that the resulting mental dysequilibrium is not simply due to its serotonin inhibitory properties but may be mediated by enzymatic processes

Dr Paul Hoch contributes stimulating practical comments on the tranquilizing drugs which with Sodium Amytal and Pervitin seem to afford symptomatic relief of the artificial psychoses induced by LSD This leads to Max Rinkel's scholarly comments on the various chemical theories of the causes of schizophrenia and the possible roles of adrenalin metabolites especially adrenochrome and adrenoxin Adrenochrome is described as the first substance thought to occur (naturally) in the body which has been shown to be a hallucinogen Disturbances in the adrenalin cycle seem theoretically plausible especially in view of the similar mechanisms found in phenyl pyruvic acid oligophrenia tyrosinosis alkaptonuria and albinism The clinical uses of LSD are discussed from the treatment viewpoint by Dr Sandison and Dr Charles Savage for neurotic and psychotic patients

This is a stimulating volume and should interest all clinical psychiatrists who desire to keep abreast of the current biologic theories of schizophrenia It offers some rational basis for the effects of the now popular ataractic drugs in emotional disorders Dr Louis Cholden has done a signal service to researchers and clinicians in this field by his expert compilation and judicious editing and those who knew him will be saddened by his untimely accidental death only a few months after he completed this monograph

—JOHN P McMULLIN Capt MC USN

**THE NATURE OF BRUCELLOSIS** by Wesley W. Spink M D D Sc 464 pages illustrated The University of Minnesota Press Minneapolis Minn, 1956

This book was engendered by a decision made in 1945 to study critically 100 bacteriologically proved cases of brucellosis and to follow the subsequent course of the patients

After giving credit to many colleagues at the University of Minnesota and abroad the author discusses all of the aspects of brucellosis of interest to physicians Besides devoting chapters to the clinical features, he discusses historical epidemiologic, bacteriologic, and other aspects Pathogenesis and pathology are well described without excessive devotion to details of interest only to pathologists

The author's great personal experience with brucellosis together with his opportunities for observation in foreign countries and his knowledge of the vast medical literature, qualify him uniquely as an authority on brucellosis His style is clear and although there is a slight amount of repetition there is little redundant material

Three appendixes giving reports of the U S Livestock Sanitary Association seemed unnecessary but in general the book's contents are germane and logically presented —ROBERT J HOAGLAND Col MC USA

**ENDOGENOUS UVEITIS** by Alan C. Woods M D, with illustrations by Annette Smith Burgess 303 pages illustrated The Williams & Wilkins Co, Baltimore, Md, 1956 Price \$12.50

The material of this book is presented under the headings of the different phases of the uveitis problem—classification pathogenesis pathology, diagnosis and treatment—rather than as consecutive discussions of each individual clinical entity since this is the sequence in which the problems of uveitis confront the student

Methods used in diagnosis and treatment are described in detail the illustrations are excellent, and the bibliography is adequate This book is the most complete treatise in print today on endogenous uveitis and fills a real need of all practicing ophthalmologists The section on the office management will be of inestimable value to the busy practitioner The phenomenal growth in knowledge about uveitis will make this book a standard reference in all ophthalmic libraries

—KENNETH HUDSON Lt Col MC USA

**HUMAN OVULATION AND FERTILITY** by Edmond J Farris Ph D 159 pages illustrated J B Lippincott Co Philadelphia Pa, 1956 Price \$6.50

This text sets forth the record of years of hard, tedious careful investigations regarding ovulation time in the human menstrual cycle A new and apparently very accurate, simple test for determination of this exact date is outlined in clear practical terms Tables of results in actual fertility problems of patients who have successfully conceived healthy children are offered Methods of study of barren couples, legal aspects of artificial insemination, and use of irradiation in an eff



stimulate ovulation are all discussed quite clearly in this text. Many facts of this intricate problem are discussed freely.

This concise and authoritative text will be of value to specialists and general practitioners alike. Here is a practical method for calculating fertile days with greater accuracy than those used heretofore. The fine chapter "Information of Value to the Barren Couple" will be of great aid to the physician in counseling his infertile patients.

This book is carefully documented and well worth careful study by all physicians interested in gynecology and obstetrics.

—ROY W TANDY Sr Capt MC USN

**BIOCHEMISTRY OF THE EYE** by Antoinette Pirie M A Ph D and Ruth Van Heyningen M A D Phil 323 pages illustrated Charles C Thomas Publisher Springfield Ill 1956 Price \$7

This rather technical book presents a well documented compilation of what is known of the detailed chemistry of the major portions of the eye. As the authors state in their preface they have avoided details of subjects on which vast amounts of literature have already appeared likewise they have avoided areas in which little of the biochemistry is authoritatively known such as tears lids lacrimal glands conjunctiva sclera choroid or optic nerve. Of the remaining functions of the eye almost one half the space is allotted to the lens and its chemistry. Facts are stated and credits are given without a great deal of discussion. The authors fail to indicate how much of the reported work is their own. The extent of their contributions is reflected in the long list of references at the end of each chapter. Their modesty is commendable.

Lesser but adequate space is devoted to the biochemistry of the cornea the retina the vitreous and the relationship between the aqueous humor and the ciliary body. A final chapter deals briefly with the tremendous subject of the effects of nutritional disease upon the eye.

That the book is intended for all physicians as well as ophthalmologists is evident. A glossary carefully defines cataract macula and a host of other obvious words. This however does not detract from the book. The manner in which this highly technical data is presented is most pleasing. In particular I enjoyed the too brief chapter on chemical aspects of vision. The subject matter of the whole book was easy to follow not technical beyond reason and methodically presented. It is worth the time of everyone interested in ophthalmology.

—DAWSON A. MILLS Capt MC USN

**PLASTIC REPAIR OF GENITO-URINARY DEFECTS** by George Bankoff M D D Ch 355 pages illustrated Philosophical Library Inc New York N Y 1956 Price \$1 50

The title of this book is not descriptive of its contents as the defects and anomalies of neither kidney nor ureter are considered and surgical corrections of some diseases of the lower tract (e g impotence testicular tumors) are included.

The book is predicated on an excellent idea—the need of a handbook outlining genitourinary defects, accompanied by a collection of the various successful surgical techniques employed to correct them. However, authorship in a specialty field requires considerable technical experience in all areas covered or collaboration with an expert in certain areas. The author, a plastic surgeon, apparently did not seek the collaboration of a urologist. The book would be strengthened by deletion of the redundant outline of basic anatomy and by omission of the section on sterility and impotence since the latter is not pertinent to the title.

The section on malformations and plastic repairs is a fair summary of the many and better known surgical techniques described in correction of genital and lower tract urologic defects and anomalies. The illustrations and reproductions range from fair to good, but the accompanying text often lacks clarity or correlation with the pictures which they

This book published in 1956 is based on a bibliography on literature prior to 1948. Widening of horizons in plastic surgery since the advent of chemotherapy with abolition of tuberculous abscesses with a streptomycin sulfate and modification of anastomosis and tissue techniques has occurred in the interval. The necessity of editing and proofreading, especially by a urologist, is obvious when one finds the Tork technique for rectopexy repeated several pages later under "cysto-orchidectomy."

—CHARLES W. HOFFMAN, Jr., LL. CO. M. 1954

**ESSENTIALS OF PSYCHOLOGY** by Werner Wolff, 2d revised and enlarged edition of *Wolff's Psychology* 385 pages, illustrated, Grune & Stern, Inc., New York N. Y. 1956. Price \$6.50.

This volume is divided into 10 chapters covering the field of psychology, the areas of research, and the chief problems being dealt with by present-day workers in the field. Topics such as perception, retention, thinking, intelligence, emotion, personality, attitudes, and motivation are reviewed, their meaning in the study of man discussed, and the pertinent literature brought to the attention of the reader.

The volume provides an excellent analysis and synthesis of the problems facing psychology as a science compared to the problems facing the other sciences. However, the author's attempt to compress the field of psychology and pertinent research into an introductory volume has resulted in a vocabulary difficult for a beginning student.

The effort to present these studies within the framework of the developing science of psychology is skillful. The difficulties arising in psychology when the methods and restrictions of other sciences are foisted upon the studies of human behavior are discussed and well exemplified. Many highly considered theories are brought to the reader's attention by the author, and the evidence garnered as to the correctness of these theories is succinctly discussed. The book on the whole is interesting and useful for the serious young student of psychology who needs a general view of the field. —PHILIP L. GOLDBERG, CAP. USAF (MSc)

**ATLAS OF EXFOLIATIVE CYTOLOGY** by George N Papanicolaou M D Ph D 230 pages of text 26 full page color plates complete with loose-leaf leather binder Published for the Commonwealth Fund by Harvard University Press Cambridge Mass 1954 Price \$18 Supplement I for insertion in 1954 Atlas 50 pages of text 17 full page color plates Published for the Commonwealth Fund by Harvard University Press Cambridge Mass 1956 Price \$4

This important atlas of exfoliative cytology profusely illustrates normal and neoplastic cells from various secretory and excretory fluids of the body. It is in loose leaf form which allows periodically the addition of new plates as they are published in this rapidly growing field.

It is a truly comprehensive approach to the study of cells exfoliated from the respiratory digestive urinary and male and female genital systems pleural peritoneal and hydrocele fluids breast secretions and aspirations and changes noted in cells from various metabolic and hormonal influences. The latter is illustrated for example by plates of normal and abnormal mitotic figures and cells from vaginal cervical and urine sediment smears in cases of pregnancy.

In Supplement I the plates show a comparative illustration of cells as seen in tissue sections and in smears. This brings out clearly not only similarities but also marked dissimilarities between the cells in the two different preparations.

Another useful feature of the atlas is a description of the technical procedures used in obtaining and preparing smears from various sources. This will make the book valuable to the clinician as well as to the pathologist. —VERNOE MARTENS Capt MC USA

**PROCTOLOGY** by Harry F Bacon M O Sc D LL D Stuart T Ross M D and Porft to Mayo Recto M D M Sc 441 pag 228 illustrations and 5 plates in full color J B Lippincott Co Philadelphia Pa 1956 Price \$10

This concise almost outline type book is in reality a rewritten version of *Essentials of Proctology* by the senior author originally published in 1943. The present authors have very carefully eliminated extensive and controversial material relating to etiology history pathology anatomy treatment et cetera. In fact no bibliography or reference to other authors is included. It is designed to be a quick reference book primarily for medical students interns general practitioners and busy practicing surgeons. To this end the authors succinctly accomplish their purpose in delineating the fundamentals of basic proctology.

Briefly the essential anatomy and physiology are taken up special examination procedures and laboratory tests are described while anesthetic agents pre and post operative treatment and special nursing care are covered. The regional disease processes and their surgical treatment in both office and hospital are then described by chapters.

each factual, definite and to the point. A special chapter on intestinal parasites by Samuel W. Eisenberg of the Department of Proctology at Temple University has been added, and although far from being all inclusive does cover the more commonly encountered parasites.

The authors are to be congratulated on setting down in such a clear intelligent manner their extensive experience in the field of proctology.

—LISTER J. POPE Capt MC USN

**CLINICAL ORTHOPAEDICS** No. 7 "Tumors of Bone" *Anthony F. De Palma* Editor-in-Chief. This number contains a special third section on "Motorist Injuries and Motorist Safety" by *Jacob Kulowski MD*. 354 pages illustrated. J. B. Lippincott Co. Philadelphia Pa. 1956. Price \$7.50.

Anthony F. De Palma shows an unusual flair in assembling contributions outstanding both in scientific value and in reader interest.

The section on bone tumors includes essays by the world's leading authorities on the subject such as Geschickter, Copeland, Jaffe, Stein and others. While the material presented is not new, the presentations are concise, authoritative, well illustrated and backed by survival statistics.

The section devoted to general orthopedics is composed of eight contributions. The general trend of this section is bolder, more experimental than the more orthodox attitude toward treatment of the bone tumors. Outstanding research reports are Cobey's search for nonallergic polymetizing plastic and Tucker's use of cultured calf bone in human bone grafts. Of clinical interest is a treatise from the Albert Einstein Medical Center on calcification of the intervertebral disk disappearing dormant and silent.

The section on motorist injuries and safety is encouraging as it reflects the serious and systematic efforts of a team including physicians, statisticians and engineers to find solutions to present problems and those in the future. The subject treatment is both thorough and concise. The bibliographies after each of the 18 separate chapters are exhaustive.

—FRANK DEHNE Col MC USA

**MUSCLE TESTING** *Techniques of Manual Examination* by *Lucille Daniels M.A.* *Marian Williams Ph.D.* and *Catherine Worthingham Ph.D.* 2d edition. 176 pages illustrated. Format and text illustrations by *Harold Black*. Anatomical drawings by *Lorene Sigal*. W. B. Saunders Co. Philadelphia Pa. 1956.

I have used the first edition of this book for many years and considered it to be the best text on the subject. However, I believe the second edition surpasses the 1946 one in many instances.

The material is presented simply and is readily understandable. The illustrations are most effective. "Positioning of a patient" gives the student an excellent illustration and guide of the proper way to position a patient. Also in many illustrations throughout the book the patient is pictured with more support which is much less startling to the patient.

therefore he is less apprehensive of trying to perform the desired exercise procedure

The authors have added considerable valuable information to this manual. The facial muscles are excellently outlined. This feature was not available in the 1946 edition and is especially helpful to both the student and the physical therapist.

This manual is written in a clear easy to read style. I highly recommend this text for teaching muscle testing and also feel that it would be an excellent reference source for all physical therapists.

—MAURINE MECKES Lt MC USN

**THE SPINE** Anatomico-Radiographic Studies Development and the Cervical Region by Lee A Hadley M D 156 pages illustrated Charles C Thomas Publisher Springfield Ill 1956. Price \$6.50

This book is a well written monograph discussing the embryologic development of the spine various developmental disturbances that produce anomalies certain conditions such as trauma and disease that cause abnormal anatomical variations and the effects of disk degeneration. It deals primarily with the cervical spine with special reference to the differentiation between anomalies and the results produced by injuries and the medicolegal implications thereof. Only brief mention is made of conditions found in the other regions of the spine. The text is concise and amply illustrated with well chosen good quality roentgenograms micrograms and photographs of living and cadaver specimens. It should prove of interest to the roentgenologist orthopedist and neurosurgeon. —MALCOLM W MASON Capt MC USN

**PHARMACOLOGY AND ORAL THERAPEUTICS** A Textbook for students and Practitioners by Edward C Dobbs D D S F A C D 11th edition 579 pages illustrated The C V Mosby Co St Louis Mo 1956 Price \$9

This is the 11th edition of a widely known text by an outstanding authority in the field of pharmacology. The introduction of many new drugs with the resultant improvement in therapy has prompted the preparation of this new and latest edition. The title has been changed to emphasize the field of oral medicine and the drugs are described to conform to the current revisions of the 15th edition of the U S Pharmacopoeia and the 10th edition of the National Formulary.

The text has been divided into two distinct categories. Pharmacology and therapeutics. In the first part the drugs have been grouped into chapters representing anatomic and physiologic systems with a concise description of the anatomy and physiology of the system under consideration. The drugs are then described and correlated in accordance with their clinical indications and dosage. This section includes a rather detailed description of the types and pharmacology of various local anesthetics.

Part 2 is prefaced with an excellent chapter on prescription writing, rewritten to conform to the new nomenclature of the U. S. Pharmacopoeia and the National Formulary. The remainder is devoted to the treatment of the more common diseases encountered in the field of oral medicine. While the book is not a complete coverage of diagnoses and treatment planning, it is lucid, concise, and accompanied by excellent tables and prescriptions.

This volume should be used by the general practitioner as a reference or course in pharmacology and oral therapeutics and as a daily source of information in the use of new drugs and their therapeutic indication.

—JOHN R. McFLOY 1st Col. USAF (DC)

**VENOUS RETURN** by Gerhard A. Brecher M.D. Ph.D. 148 pages illustrated. Grune & Stratton Inc., New York N.Y., 1956. Price \$6.75.

This monograph presents a comprehensive account of Dr. Brecher's work and is an excellent historical survey of efforts preceding his own. The illustrations are profuse and excellent and many are original. The author has applied synthetic and analytic approaches to the problem of venous return. This monograph is the only current one that gives a comprehensive analysis of the determination of venous return and its adaptation to cardiac output based on experimental measurements. It is excellent background material for surgeons and radiologists alike, particularly those doing thoracic or cardiac work. The author accomplishes this work by using completely modern equipment in testing his concepts. His final remarks are worth repeating: "The combination and integrated action of all factors—the ventricular injection, the respiratory pump, the systolic ventricular attraction, the recently demonstrated diastolic ventricular suction, the muscle pump and veno motor activity—widen the margin of safety which assures the adequacy of venous return under normal and abnormal conditions."

—ARCHIBALD G. M. MARTIN III Maj. USAF (MC)

**STUDIES IN TOPECTOMY** edited by Nolan D. C. Lewis M.D. Carney Landis Ph.D. D.Sc. and H. E. King Ph.D. 248 pages. Grune & Stratton Inc. New York N.Y., 1956. Price \$6.75.

This monograph describes a series of studies done by the New York State Associates in Brain Research between June 1948 and April 1949. The general aim of the project "was the furtherance of the scientific evaluation of psychosurgery as a therapy together with the accumulation in passing of whatever basic information might be gathered concerning the interrelation of frontal lobe brain structure and human behavior." Some 95 patients with various types of schizophrenic reactions were used for the study, 66 of these patients had one of two types of topectomy performed and the remainder (29) served as controls.

The discussion of this complex subject includes the surgical procedure, physiological effects, vestibular function, autokinesis, psychometric studies, complex mental functions, a time sampling study of

activity psychophysiology sexual behavior two independent evaluations of psychiatric effects and social service studies In short under one cover is presented a host of multidisciplinary reports concerned with the same patient group Each discipline presents a more or less self contained report concerning the specific questions raised by the psychosurgical procedure The chapters are clearly and excellently written with adequate bibliographic material and the volume has a better than average index which makes possible excellent cross reference between the disciplines concerned

—SAMUEL V THOMPSON Capt MC USN

**INTERNAL MEDICINE** *A Physiologic and Clinical Approach to Disease* by Robert P McCombs M D F A C P 706 pages illustrated The Year Book Publishers Inc Chicago Ill 1956 Price \$10

This volume which is handbook size comprises a summary of the most important clinical facts physiologic concepts diagnostic methods and therapeutic measures used in the study and management of internal diseases The author states in the preface that the handbook size has been retained by avoiding duplication and eliminating detailed discussions of subjects that are primarily related to independent specialties His aim is attained and a very complete table of contents reference bibliography for each chapter and index with cross reference make the handbook readily usable in daily work

The book is a useful handy and ready reference for the specialist in internal medicine and a valuable addition to the library of any practicing physician —WILLIAM S GEORGE Col MC USA (Ret)

**NEW BASES OF ELECTROCARDIOGRAPHY** by Demetrio Sodi Pallares M D with the collaboration of Royall M Calder M D 727 pages 520 illustrations The C V Mosby Co St Louis Mo 1956 Price \$18 50

This is the English translation of the third Spanish edition of Dr Sodi Pallares text It brings together in one volume the author's views on many of the controversial principles of electrocardiography and summarizes the extensive experimental and clinical studies that have been conducted by the author and his associates

The mathematical and electrical basic principles of electrocardiography are discussed in considerable detail as well as the experimental methods from which his conclusions are derived One of the most valuable sections of the text for the clinical cardiologist is a summary of the careful correlative studies that have been accomplished relating electrocardiographic change and anatomic diagnosis in congenital heart disease The author emphasizes the value of these changes in the differential diagnosis of congenital heart disease Often they reflect the hemodynamic alterations more accurately than do the clinical and radiologic features This is a complex technical work that is not designed to teach clinical electrocardiography to the average clinician However it is highly recommended as a valuable reference work for the investigator or advanced student of electrocardiography

—SELDON J WALKER Col MC USA

**ESSENTIAL UROLOGY**, by Fletcher H. Colby M. D. 3d edition (26 pages illustrated) Williams & Wilkins Co. Baltimore, Md., 1946. Price \$8

Attesting to the popularity of this book is the fact that this is the third edition to appear in the last six years. An attempt has been made to keep pace with the rapid advances in the field of urology. To a large extent this has been very successful although retrospective pro-nomography is not discussed. There have been clarifying revisions in the field of urinary tract infections, including tuberculosis. As in the previous editions the sections on anatomy and physiology are especially well done. The entire field of urology is covered in this book which of course limits the exhaustiveness with which each entity can be covered. While the detail desired by the specialist is not to be found the list of references is excellent. This makes the book of value to the specialist as well as to the student, intern, resident, and teacher.

The section on basic sciences as related to urology could be read with profit by all those preparing for their board examinations in urology. This is probably the best small book on urology in the English language. — HOWARD POLLACK, Capt. USAF (MC)

**DERMATOLOGY** by Donald M. Pillsbury M. A. D. Sc. (Hon.) M. D. Walter H. Shelley M. D. Ph. D. and Albert M. Aligman, M. D. 1st Ed. 1,330 pages 117 illustrations on 364 figures. W. B. Saunders Co. Philadelphia, Pa. 1956. Price \$20

This integrated effort of three well known dermatologists with varied and extensive experience in teaching, research, and clinical practice is novel and rewarding through its reflection of the combined years of experience represented. The result is not only an informative and useful text but one with information which is conveniently accessible.

In addition to a lucid and titillating preface (worth the reading) there are 13 chapters on applied basic principles of which the chapters on mycology and bacteriology of the skin are unique to this book. Another five chapters discuss allergy and hypersensitivity, four chapters are devoted solely to diagnosis, while three chapters are concerned with a discussion of therapy. This portion of the volume represents about 30 per cent of the work; the balance, or remaining 27 chapters, deals with cutaneous medicine (clinical dermatology). Throughout the role of the skin as it reflects systemic disease is stressed, making the book of particular value to all practicing physicians as well as invaluable to the internist.

The discussion of principles of diagnosis constitutes an excellent exposition of differential diagnosis. The accompanying photographs admirably illustrate the differentiation necessary to make a diagnosis. The clinical section, more than conventional, includes all fresh and new material with the chapter on dermatitis and eczema practically a classic. The discussion on therapy is outstanding in its clear cut and no-nonsense evaluation, particularly in its account of adrenocortical preparations. The chapter on ionizing radiation is the first practical account



that I have run across. Its conservatism is laudable and the content completely adequate. The index of 48 pages is complete yet not redundant.

The authors have indeed achieved their purpose in presenting dermatology in a new and readily acceptable form free from obvious error or major controversy. Simplified yet with full coverage, scholarly but not pedantic. Its boldness in deviating from past patterns makes it enjoyable to read and convenient as a ready reference.

—ROBERT L. GILMAN Capt MC USN

THE LABYRINTH Physiology and Functional Tests by Joseph J. Fischer  
M D 206 pages illustrated Grune & Stratton Inc New York N Y  
1956 Price \$6

This book fulfills a need which has been very evident for a long time. It is an eminently successful attempt on the part of the author to bring organization out of chaos. The literature is replete with articles pertaining to theories, hypotheses, and clinical aspects of function of the labyrinth. The author states concisely the controversial theories and follows with clinical application of labyrinthine functions.

The complex subject of otoneurology and its numerous facets are dealt with in terms which are easily followed and understood. This material is concisely and accurately presented. The bibliography is voluminous and material well indexed for ready reference. This is an excellent book which is especially designed for the resident in otolaryngology as well as the neurologist.

—FRANK J. SHAFFER Col MC USA

DISEASES OF THE BREAST by C. D. Haagensen, M D 750 pages illustrated  
with 404 figures and 25 charts W. B. Saunders Co Philadelphia Pa  
1956. Price \$16

The author is to be commended on a very readable and comprehensive text. Every conceivable aspect of disease of the breast appears to have been covered.

Worthy of special comment is the section on anatomy. Also the surgical treatment of carcinoma of the breast is given careful treatment. The author's technique is clearly described in detail and well illustrated. In addition, the McWhirtet method of simple mastectomy and the extended operations where the supraclavicular and internal mammary areas are attacked are thoughtfully considered and the pros and cons weighed.

The illustrations are generous in number and excellent in quality. The type is very readable but a little too small and closely spaced. There are numerous tables of a statistical nature which are properly included in a comprehensive text.

The medical student, the general practitioner, and the surgeon will all find here material for their particular needs.

—MAX L. SMITH Lt Col MC USA

February 1957

REVIEWS OF RECENT BOOKS

**DISEASES OF THE HEART** by Charles F. Brinkley M.D. 4th edition 1956  
Pages illustrated W. B. Saunders Co., Philadelphia Pa. 1956. Price \$18

The second edition of this well known text contains a new section on the graphic methods of cardiac examination consisting of discussions of roentgen examination, electrocardiography and vector cardiography and ballistocardiography, phonocardiography and cardiac catheterization. The pages are larger and two columns per page have replaced the single column. Because of increase in size the text is about 25 per cent more material per page and there are 57 more pages than in the first edition. Larger, bold face type has been used for headings and subheadings.

By necessity the section on electrocardiography and vector cardiography is abbreviated but it serves the useful purpose of presenting the reader to the author's opinions so that interpretation of the electrocardiogram is facilitated.

Classical references have been retained but bibliographies have been greatly expanded by the inclusion of many new references including the 1956 literature, making this a truly up-to-date text. New illustrations have been added and appropriate ones from the first edition have been retained.

The section on congenital heart disease has been extensively rewritten. For example the section on aortic septal defect with mitral stenosis (Lutenbacher's Syndrome) which formerly occupied about two pages has been replaced by two sentences indicating the nature of this condition. The need for accuracy in diagnosis is stressed because of the availability of corrective surgery by new techniques.

In the treatment of myocardial infarction the author still recommends the time honored method of bed rest. The "arm-chair" treatment and the misinterpretation of this method by some physicians to permit early ambulation is discussed. The author prefers the use of an anticoagulant in all cases where no contraindication exists.

The chapter on bacterial endocarditis is completely and superbly written, as one would expect in view of the great experience and extensive publications by the author on this subject.

This is an excellent student textbook and is highly recommended to all interested in heart disease.—SAMUEL H. SANDIFER Lt Col MC USA

**CLINICAL HEMATOLOGY**, by Maxwell M. Wintrobe M.D. Ph.D. 4th edition  
1184 pages 236 illustrations and 20 plates 18 in color Lea & Febiger, Philadelphia Pa. 1956 Price \$15

Dr. Wintrobe has again demonstrated his ability to present a subject of vast ramifications in such a manner that technicians, students, teachers and specialists can all reach for the same volume.

The main advances in hematology within the past few years have been clinically correlated by the revision of three chapters and the addition of two others (one on blood groups and blood transfusions and another on abnormal hemoglobin syndromes). In addition 16 illustrations 3 plates 23 tables and 1 600 references have been added. This has been accomplished with the addition of only about 30 pages and has resulted in an improvement in organization and indexing. The practical clinical aspects of radioactive materials such as iron vitamin B<sub>12</sub> and chromium have been integrated into this latest edition.

Emphasis on diagnosis and treatment correlated with the practical application of the laboratory procedures involved makes this present volume as those in the past a clinical text on hematology aimed at the practicing physician. The bibliographies for each chapter are noteworthy because of their completeness and current interest.

As with the previous editions the book should be found on every medical library shelf that is frequented by clinicians. Every physician whose duties involve hematologic aspects of disease would find it a worthy and readable reference for his personal office library.

—JULES J. MCNERNEY Lt Col MC, USA

**MEDICAL EFFECTS OF THE ATOMIC BOMB IN JAPAN** edited by Ashley W. Oughterson M D and Shelds Warren M D Foreword by Lewis L. Strauss Chairman U S Atomic Energy Commission 1st edition National Nuclear Energy Series Manhattan Project Technical Section Division VIII Volume 8 477 pages illustrated McGraw-Hill Book Co Inc New York N Y 1956 Price \$8

This book is one of approximately 60 volumes in the extensive documentation of the technical and scientific aspects of the atomic energy program during the operations of the Manhattan Project in the mid 1940's. The volumes written and still to be completed are entitled *The National Nuclear Energy Series*. This particular book is a partial summary of the very large amount of data collected by the medical members of the Joint Commission for the Investigation of the Effects of the Atomic Bomb in Japan. The data was originally reported in a six volume paper-bound series in 1951.

Although many of the individual findings have been reported separately in the Japanese and American medical literature this book summarizes pertinent findings in a well oriented readable style.

The essential findings are grouped under five chapter headings including (1) Scope of Damage (2) the Effects on Medical Care and Facilities (3) Number and Types of Casualties (4) Clinical Observations and (5) Hematology and Pathology. Representative photographs some in color have been selected to demonstrate the clinical findings. Unfortunately some of the historical aspects are lost through the omission of the original Japanese descriptions. While this book will be a valuable contribution to medical libraries for detailed studies the student is referred to the original six volume series.

—JAMES B. HARTGERING Lt Col MC USA

## New Books Received

Books received by the *U S Armed Forces Medical Journal* are acknowledged in this department. Those of greatest interest will be reviewed in a later issue.

- MEDICAL SCIENCES** Volume I, Series VII of Progress in Nuclear Energy edited by *J C Rutherford*, *J Coursaget* and *J F Fowitt* 165 pages McGraw Hill Book Co Inc New York N Y 1956 Price \$6.
- THE HAPPY LIFE OF A DOCTOR** by *Kopet Lee M D* 278 pages illustrated Little Brown & Co Boston Mass 1956 Price \$4
- CLINICAL EXAMINATIONS IN NEUROLOGY** by Members of the Section of Neurology and Section of Physiology Mayo Clinic and Mayo Foundation for Medical Education and Research Graduate School University of Minnesota Rochester Minn 370 pages illustrated W B Saunders Co Philadelphia Pa 1956.
- AMINO ACID HANDBOOK** Methods and Results of Protein Analysis by *Richard J Block Ph D* with the co-operation of *Kathryn W Weiss A B* 386 pages illustrated Charles C Thomas Publisher Springfield Ill 1956 Price \$10 50
- THE VISUAL FIELDS** A Textbook and Atlas of Clinical Perimetry by *David O Hamington A B M D F A C S* 327 pages 234 illustrations and 9 color plates The C V Mosby Co St Louis Mo 1956 Price \$16
- THE YEAR BOOK OF OBSTETRICS AND GYNECOLOGY** (1956-1957 Year Book Series) edited by *J P Greenhill B S M D F A C S F J C S (Honorary)* 592 pages illustrated The Year Book Publishers Inc Chicago Ill, 1956 Price \$6 75
- PRESCRIPTION WRITING AND MATERIA MEDICA FOR DENTISTS** by *L Richard Cipes Ph C D D S* 4th edition (24 pages illustrated Dental Items of Interest Publishing Co Inc Brooklyn N Y 1956 Price \$9 50
- ATLAS OF TUMORS OF THE NERVOUS SYSTEM** by *H M Zimmerman M D Martin G Netsky M D* and *Leo M Davidoff M D* 191 pages 277 illustrations 233 in color 4 tables Lea & Febiger Philadelphia Pa 1956 Price \$25
- BONE STRUCTURE AND METABOLISM** CIBA Foundation Symposium edited by *G E W Wolstenholme O B E N A N B B Ch* and *Cecilia M O Connor B Sc* 299 pages 121 illustrations Little, Brown & Co Boston Mass 1956 Price \$8
- POSTURAL AND RELAXATION TRAINING IN PHYSIOTHERAPY AND PHYSICAL EDUCATION** by *John H C Colson F C S P M S R G N A O T* 105 pages illustrated Charles C Thomas Publisher, Springfield Ill 1956 Price \$2 50

## U S ARMED FORCES MEDICAL JOURNAL

312

**WIRE BRUSH SURGERY** in the Treatment of Certain Cosmetic Defects and Diseases of the Skin by James W. Burks Jr. M S M D American Lecture Series Publication No 300 A Monograph in the Bannerstone Division of American Lectures in Dermatology edited by Arthur C. Curtis M D 154 pages illustrated Charles C Thomas Publisher Springfield Ill 1956 Price \$6.75

**ANESTHESIA FOR SURGERY OF THE HEART** by Kenneth A. Keown M D F A C A American Lecture Series Publication No 304 A Monograph in The Bannerstone Division of American Lectures in Anesthesiology edited by John Adriani M D 109 pages illustrated Charles C Thomas Publisher Springfield Ill 1956 Price \$3.75

**FUNDAMENTALS OF PHYSICS AND APPLICATIONS** by Howard O. Stearns 2d edition 384 pages illustrated The Macmillan Co New York N Y 1956

**TRAINING OF THE LOWER EXTREMITY AMPUTEE** by Donald Kerr B B A and S. G. Brunstrom M A Introduction by T. Campbell Thompson M D 272 pages illustrated Charles C Thomas Publisher Springfield Ill 1956 Price \$6.50

**PERSONALITY STRESS AND TUBERCULOSIS** edited by Phineas J. Sparer M D 629 pages illustrated International Universities Press Inc New York N Y 1956 Price \$12.50

**PAPER ELECTROPHORESIS** CIBA Foundation Symposium edited by G. E. Wolstenholme O B E M A M B Ch and Elaine C. P. Mil A H W C A R I C 224 pages 74 illustrations Little Brown & Co Boston Mass 1956 Price \$6.75

**GLAUCOMA** Transactions of the First Conference December 5, 6 and 7 1955 Princeton N J edited by Frank W. Neumeier M D Sponsored by the Josiah Macy Jr Foundation New York N Y 1956 Price \$4.50

**DIAGNOSTIC METHODS IN VETERINARY MEDICINE** by Geo. F. Boddie B Sc (Edin) M R C V S F R S E 4th edition 412 pages illustrated J. B. Lippincott Co Philadelphia Pa 1956 Price \$6.50

**THE SEXUAL CRIMINAL A Psychoanalytical Study** by J. Paul de Rivecourt M D F A C S 2d edition 375 pages illustrated Charles C Thomas Publisher Springfield Ill 1956 Price \$6.50

**COSMETICS** Their Principles and Practices by Ralph G. Harry F R I C 786 pages illustrated Chemical Publishing Co Inc New York N Y 1956 Price \$17

**HOMOSEXUALITY** Disease or Way of Life? by Edmund Bergler M D 302 pages Hill and Wang Inc New York N Y 1956 Price \$5

**EXAMINATION OF THE NERVOUS SYSTEM** A Student's Guide by A. Theodor Steegmann M D 164 pages illustrated The Year Book Publishers Inc Chicago Ill 1956 Price \$3.75

**ADMINISTRATIVE MEDICINE** Transactions of the Fourth Conference October 31 November 1 and 2 1955 Princeton N J edited by George S. Stevenson M D Sponsored by the Josiah Macy Jr Foundation New York N Y 1956 Price \$4.25

# UNITED STATES ARMED FORCES MEDICAL JOURNAL

*Published Monthly by  
the Armed Forces Medical Publication Agency  
Department of Defense*



*Editor*

CAPTAIN BENNETT F. AYLRI, MC USN

*Associate Editors*

COLONEL ROBERT S. ANDERSON MC USA

COLONEL PAUL V. DAVIS USAI (MC)

*Assistant Editor*

LIEUTENANT FRANKLIN M. ROBERTS, MC, USNR

UNITED STATES

GOVERNMENT PRINTING OFFICE

WASHINGTON 1957

THE PRINTING OF THIS PUBLICATION HAS BEEN APPROVED BY  
THE DIRECTOR OF THE BUREAU OF THE BUDGET, 20 FEB 1956

# Monthly Message

From the Oath According to Hippocrates in so Far  
as a Christian May Swear It

"Blessed be God the Father of our Lord Jesus Christ who is  
blessed for ever and ever I lie not

"I will bring no stain upon the learning of the medical art  
either will I give poison to anybody though asked to do so  
nor will I suggest such a plan Similarly I will not give treatment  
to women to cause abortion treatment neither from above nor  
from below But I will teach this art to those who require to  
earn it without grudging and without an indenture I will use  
treatment to help the sick according to my ability and judgment  
And in purity and in holiness I will guard my art into whatso-  
ever houses I enter I will do so to help the sick keeping myself  
free from all wrongdoing intentional or unintentional tending to  
death or to injury and from fornication with bond or free man or  
woman Whatsoever in the course of practice I see or hear (or  
outside my practice in social intercourse) that ought not to be  
published abroad I will not divulge but consider such things to  
be holy secrets Now if I keep this oath and break it not may  
God be my helper in my life and art and may I be honoured among  
all men for all time If I keep faith well but if I forswear myself  
may the opposite befall me "

*Frank B Berry*  
FRANK B BERRY M D  
Assistant Secretary of Defense  
(Health and Medical)

# Table of Contents

Conservative Management of Urteral Calculi Without Use of Hazardous Instruments— <i>Eduard Gartman</i> .....	313
Serum Gamma Globulin in the Burned Patient: With Special Reference to Septicemia— <i>Bernard Balikov Curtis P. Artz and Donald F. Solometo</i> .....	321
The Effect of Pain on Performance— <i>Fred B. Benjamin</i> .....	332
Psychiatric Prediction and Military Effectiveness Part III Factors Influencing Psychiatrists— <i>Albert J. Glass Francis J. Ryan Ardie Lubin C. V. Ramana, and Anthony C. Tucker</i> .....	346
Use of X Rays and Other Ionizing Radiation The Responsibilities of the Medical Profession— <i>United Nations Scientific Committee on Effects of Atomic Radiation</i> .....	358
Treatment of Paraphimosis— <i>Richard W. Cletsouay and Evan L. Lewis</i> .....	361
Chlorpromazine Jaundice— <i>Roberto E. Benitez Theodore A. Kiersch Joseph Castagno and Edwin M. Goyette</i> .....	365
Importance of Flexion in Cervical Traction for Radiculitis— <i>Benjamin L. Crue Jr</i> .....	374
CLINICOPATHOLOGIC CONFERENCE	
U S Army Hospital Frankfurt APO 757 New York N Y .....	381
SERVICE ARTICLES	
Present Day Military Obligations— <i>Daniel C. Elkin</i> .....	394
A Psychiatric Study of a Retraining Command— <i>Nathan Schlessinger and David Blau</i> .....	397
Experiences in Providing Salad Vegetables to American Forces in Japan— <i>Lymon P. Frick, Gottlieb L. Orth Neil O. Wilson Walter F. Malizia and Ralph O. Anslow</i> .....	406
Dynamic Factors in Psychiatric Discharges of Midshipmen— <i>Dean J. Plazak</i> .....	418
CASE REPORTS	
Vivax Malaria Without Primary Attack in Korean Veterans— <i>Richard S. Homer</i> .....	427
Tumors of the Testis in Infants— <i>Evan L. Lewis</i> .....	431
Cross Sensitization in Eczematous Contact Dermatitis— <i>William J. Wagner</i> .....	438
Ruptured Omphalocele— <i>Robert C. Ray</i> .....	445
DEPARTMENTS	
A Message From the A. M. A. .....	449
Navy Surgeon General Receives French Medal of Honor .....	452
Officers Certified by Specialty Boards .....	453
BOOKS	
Reviews of Recent Books .....	455
New Books Received .....	465



# Foreword

The United States Armed Forces Medical Journal is the medium for disseminating information of administrative and professional interest to all medical personnel of the Department of Defense. The Assistant Secretary of Defense (Health and Medical) and the Surgeon General of the several services invite all medical officers, dental officers, Medical Service Corps officers, Nurse Corps officers and officers of the Veterinary Corps of the Armed Forces and the medical consultants of the Army, Navy and Air Force to submit manuscripts for publication in this Journal.

FRANK B. BERRY, M.D.

*Assistant Secretary of Defense (Health and Medical)*

MAJOR GENERAL SILAS B. HAYS

*Surgeon General, United States Army*

REAR ADMIRAL BARTHOLOMEW W. HOGAN

*Surgeon General, United States Navy*

MAJOR GENERAL DAN C. OGLE

*Surgeon General, United States Air Force*

# UNITED STATES ARMED FORCES MEDICAL JOURNAL

---

Volume VIII

March 1957

Number 3

---

## CONSERVATIVE MANAGEMENT OF URETERAL CALCULI

Without Use of Hazardous Instruments

EDWARD GARTMAN *Lieutenant Colonel MC USAR*

**A** REVIEW of the literature covering the treatment of ureteral calculi disclosed that an extensive collection of reports of accidents resulting from the use of mechanical extractors and dilators has accumulated.<sup>1-14</sup> The published accidents, however, must represent but a fraction of the total. I personally know of 3 ureteral ruptures, 6 ureteral perforations, and 1 loss of a Jolinson basket in the ureter, all of these injuries occurred in the past five years (1951-1956) at the hands of mature, well trained endoscopists. Moving about in the armed services one frequently meets urologists who, like myself, eschew the use of these devices, but who have signally failed to publicize the fruits of their labors. For this reason the following presentation was prepared.

### CASES STUDIED

In slightly more than five years I have treated 218 patients with 237 proven ureteral stones, in addition to some 40 other patients with colic and often with blood in the urine, in whom the presence or recent passage of a calculus could not be established. One hundred and twenty one stones were found in patients at the 141st General Hospital, Kyushu, Japan, in 35 months (35

---

Presented at the James C. Kimbrough Urologic Seminar, Walter Reed Army Medical Center, Washington, D. C., 20 September 1956.

From the 141st General Hospital, Kyushu, Japan, and U. S. Army Hospital, Fort Still, Oklahoma.

per month) and 116 at U S Army Hospital Fort Sill Okla in 27 months (4.3 per month)

The distribution of patients as to sex and type of stone—whether unilateral bilateral or recurrent—may be seen in table 1. Fourteen of the men and two of the women were Negroes the rest were white. The disparity between sexes may be accounted for by the source of the patients (military hospitals) but the relative freedom of American Negroes from the disease has previously been documented.<sup>11</sup>

TABLE 1 Distribution of 218 patients by sex and by type and number of stones removed

Sex	Number of patients	Type of stone	Number of stones
Men	200	Unilateral	219
		Bilateral	182
		Recurrent	18
Women	18	Unilateral	19
		Bilateral	18
Total	218		237

The distribution of unilateral stones between right and left sides was about equal in the men. Seventeen men gave histories of one or more previous stones while nine others were subsequently treated by me for recurrent stones. One of these nine had had 14 stones removed endoscopically or surgically or had passed them spontaneously before coming to me. I managed him through three more and found a parathyroid adenoma but some months after its removal he died of chronic renal insufficiency.

Of the 18 women 11 had stones in the right side of the urinary tract. Eight of these 11 were pregnant and two were three months postpartum. Seven women had stones on the left side among these one was pregnant and one was three months postpartum.

While it is not within the province of this article to discuss the causes of stone formation certain observations can be made on the relationship of climate and hydration to the formation of stones. The climate of northwestern Kyushu is similar to that of the southern California coast except that the former has more rain. The summers are short and mild hot weather appearing suddenly early in July after the spring monsoons and ending with equal abruptness in mid September. The summers at Fort Sill

Okla., are long, intensely hot and dry, and the temperature not uncommonly attains 90°F in early April and regularly goes over 100°F after the first of June, the heat lasting until the end of September. Temperatures over 110°F are not rare. The summer of 1954 was unusually severe with more than 40 days of maximum temperatures of 100°F or more, while the summer of 1955 was uncommonly mild and wet—there were only two days with temperatures reaching 100°F.

In the three Kyushuan summers (July, August, and September of 1951, 1952 and 1953), only 42 (34.7 per cent) of a total of 121 stones were encountered, in 1954 at Fort Sill, 42 (71.2 per cent) of a total of 59 stones were seen in June through September. The 59 stones seen at Fort Sill in 1954 amounted to almost 5 per month, while there were only 44 in 1955 (3.7 per month) and 13 in the first 4 months of 1956 (3.2 per month). Prince, Senrdino, and Wolan<sup>14</sup> presented similar evidence of the effect of a hot, dry climate. It was interesting to note that Gilbert and Gersh<sup>15</sup> saw only 3.2 stones per month at Fort Sill in a 15 month period during World War II (June 1942 to August 1943).

#### SPONTANEOUS PASSAGE

The location and fate of the 237 stones have been summarized in table 2. Almost four out of five stones passed spontaneously, the largest being 0.8 cm in its greatest diameter and originally presenting in the lower third of the right ureter. Over 90 per cent

TABLE 2 *Method of removal of 237 stones in 218 patients*

Location of stone	Number of stones	Passed spontaneously	Attempted cystoscopic removal			Open operation alone
			Succeeded		Failed (operated on)	
			On first attempt	On second or later attempt		
Impacted at meatus	28	11	15	1	0	1
Below pelvic brim	141	122	15	2	0	2
Above pelvic brim	68	53	3	2	6	4
Total	237	186	33	5	6	7

of the stones passed were less than 0.5 cm long. One stone 0.3 cm in diameter was passed within two hours of the first twinge of pain, a similar sized stone, found after hematuria was observed microscopically in a routine physical examination, was passed painlessly 105 days later, the patient experiencing

widely separated episodes of colic during this time. The majority however passed in from two to nine days, the mean was almost five days. No complications or accidents accompanied the spontaneous passage of stones.

### CYSTOSCOPIC REMOVAL

The following criteria listed in the order of weight attached to them were used as indications for intervention (1) the degree of obstruction it was believed that incomplete obstructions producing dilatations above were more urgent than completely obstructing stones suppressing function (2) the size of the stone (3) its location and (4) the frequency and severity of pain. Great reliance was placed upon intravenous urography which was regularly employed before attempting instrumentation or operation.

In handling stones endoscopically the following maneuvers alone were used. Stones projecting out of or impacted in the ureteral meatus were extracted with a cystoscopic foreign body forceps, or else meatotomy with a cystoscopic scissors and extractions were performed. No rigid or metallic instruments were used beyond visual range. For stones above the meatus a single catheter was inserted by the stone and left indwelling for from 24 to 48 hours. The stone was then fragmented by gentle manipulation with various sized catheters in sequence. Radiologically "soft" stones were snared with a lasso catheter. Small stones were rolled out in the eye of a catheter.

These manipulations were successful the first time in 75 per cent of the cases. This compared favorably with the best endoscopic results. The largest stone removed transurethrally measured 0.7 cm in its greatest diameter the smallest was a minute granule less than 0.1 cm in diameter. Only nine were greater than 0.5 cm in length. There were no complications or accidents. Five other stones ranging from 0.4 to 0.9 cm in greatest diameter were removed after two or more efforts. Two of the patients suffered attacks of pyelonephritis after unsuccessful tries but again there were no accidents. Cystoscopic attempts (six per stone) to remove six stones ranging from 0.6 to 1.3 cm in diameter from the upper ureter resulted in failure and all were removed by ureterolithotomy. These represented a rather high failure rate of 13.6 per cent. Some other cystoscopic failure rates are: Dourmashkin 5.3 per cent, Wishard 8.9 per cent, Middleton and Grua 3 per cent, Prentiss, Mullenix and Whisen and 20 per cent.

The cystoscopic failures were all accompanied by one or more attacks of pyelonephritis (15 for the group). These patients suffered considerably bad prolonged hospitalizations and in one

instance, a ureteral perforation almost occurred. The largest stone in the group, 1.3 cm long, was pulled down to the middle of the pelvic ureter with a lasso. At this point one of its prongs became impaled in the ureteral wall, but the No. 00 silk thread tore before further damage could be done. The lasso tore frequently, invariably under tensions too low to injure the ureter—its major advantage. These six stones were handled at the 141st General Hospital. As a result of our experience with them, all stones seen since then in the upper ureter with diameters greater than 0.5 cm have been removed by open operation without further delay. Despite this change in attitude, I have done only four ureterolithotomies at Fort Sill.

### SURGICAL REMOVAL

There were 13 ureterolithotomies, or 5.5 per cent of the total series. At the time of operation, the stones were located as follows: ureteral meatus (large ureteroceles), 1; pelvic ureter, 3 (figs 1 and 2); upper ureter, 9. There was only one complication. Fol-



*Figure 1 Intravenous urogram showing large stone in left ureteral diverticulum in a 24 year old white woman. Stone vaginally was removed transvesically.*

Following removal of a stone in the upper ureter on 7 January 1956 a persistent fistula developed. On 20 January the patient was cystoscoped and a millet sized spicule not counted as one of the 237 stones was found in the ureteral orifice. This was removed and a No. 6 French ureteral catheter was left indwelling for 48 hours. The fistula closed promptly and the patient returned to duty on 23 January to be readmitted the following evening with an abscess in the fistulous tract. The abscess was evacuated and the patient discharged on 27 January. He has been well since. The origin of the spicule could not be determined, because a No. 6 French catheter had been passed up into the pelvis and down into the bladder at operation.



Figure 2 Plain plate showing large dendritic calculus in pelvic ureter of a 19 year old postpartum white woman. Extraperitoneal ureterolithotomy resulted in uneventful convalescence.

## DISCUSSION

The incidence of the spontaneous passage of ureteral stones in previously published series ranged from 6.2 per cent (Dourmashkin) to 53.7 per cent (Prentiss, Mulloix, and Whisenand), while intervention by open operation ranged from 7 per cent (Wishard) to 54.3 per cent (Kittredge and James<sup>10</sup>). Of the stones in my series, 78.5 per cent came out unaided, and a mere 5.5 per cent required open operation. This probably can be attributed to the fact that in the military all patients with ureteral calculi are turned over to the urologist immediately, whereas in civilian practice only the more difficult and stubborn cases are seen by the urologist. Accordingly, the present series probably represents a truer picture of the disposition of ureteral calculi than those hitherto published.

## SUMMARY AND CONCLUSIONS

In a series of 237 ureteral calculi in 218 patients, 186 stones passed spontaneously without accidents or complications, 38 were removed cystoscopically (33 on the first attempt, 5 on a second or later attempt), and 13 were removed by ureterolithotomy (6 after cystoscopic failure and 7 by operation alone). Two of the patients whose stones required more than one cystoscopic attempt had attacks of pyelonephritis following unsuccessful tries, but there were no accidents. Those patients in whom cystoscopic removal failed suffered 15 attacks of pyelonephritis, and there was one near perforation of the ureter. One patient, a chronic stone former, died of renal insufficiency some months after the removal of a parathyroid adenoma. There were no other deaths.

This series demonstrates that ureteral stones can be adequately and safely handled without the use of hazardous instruments.

## REFERENCES

- 1 Wishard W N Jr. Stones in lower third of ureter with report of instance of incarcerated basket. *J Urol* 50: 775-783, Dec 1943.
- 2 Council W A. Treatment of ureteral calculi: report of 504 cases in which Council stone extractor and dilator was used. *J Urol* 53: 534-538, Apr 1945.
- 3 Dourmashkin R L. Cystoscopic treatment of stones in ureter with special reference to large calculi based on study of 1550 cases. *J Urol* 54: 245-283, Sept 1945.
- 4 Herman L, Greene L B, and Maylar B L. Ureteral injuries. *J Urol* 56: 688-696, Dec 1946.
- 5 Ellik M. Stones in ureter: their extraction by looped catheter. *Tr West Sect Am Urol A* 13: 45-50, 1946; also *J Urol* 57: 473-478, Mar 1947.
- 6 Pate V A Jr. Lumbar ureterolithotomy. *J Urol* 63: 613-617, Apr 1950.
- 7 Taylor W N. Lumbar ureterolithotomy. *J Urol* 69: 77-81, Jan 1953.
- 8 Valenta J C, and Chenoweth C V. Foreign bodies in ureter: complication from use of electrodes for ureteral meatotomy. *J Urol* 69: 492-495, Apr 1953.
- 9 Iwano J H, and Bunts R C. Complications arising from transurethral manipulation of ureteral calculi. *J Urol* 70: 708-715, Nov 1953.
- 10 Kittredge W E, and James D. Management of ureteral calculi. *J Urol* 70: 342-345, Sept 1954.



- 11 Middleron R P and Grua O E R view of on year's experience with John on  
extractor in management of ureteral and renal calculi Tr West Sect Am Urol. A. 18:  
86-100 1951 also J Urol 68 125 136 July 1952
- 12 Nigley T C and Ellik M D Uss oo so r fe ence 11  
13 Nation E F Fac l tar on of p ssage and extr ct oo f ur teral calculi Tr West  
Sect Am Urol A. 19 133 137 1952
- 14 Prentiss R J Mullenix R B and Whis nand J M M nagement f ur teral  
stone guid for physicians o gen ral practr e California Med. 77 7 11 July 1952
- 15 Milbert A H and Gersh I Urol th a t o soldier J Urol 53 440-446 Mar  
1945
- 16 Prince C L Scardino P L and W l n, C T Effect of temp ratur humid ty  
and d hydration on form tion of renal calculi J Urol 75 209-215 F b 1956

### ARE SAINTS WELL ADJUSTED PEOPLE?

"The easy way to relieve stress is to yoke mental science and modern techniques of persuasion to the task of making everyone well-adjusted to everyone else. This is not only emptying it is in a measure useful and indeed necessary for our growing organisation demands ever more conformity ever more mutually adjusted specialism ever more acceptance to make it work at all. There seems ever less time for doubt and for dissent. Yet both Christian and scientific insights warn us that along that road lies mortal danger not only for the individual but for society also.

"For saints artists creative thinkers and above all martyrs are seldom well adjusted people and no civilisation can do without them. Least of all ours which changes faster than any has before. These are they who incubate tomorrow's orthodoxies through their heretic phase—for all orthodoxies were heresies when they were born. These are the deviants from among whom spiritual evolution will find the material for her next big adaptation. In every age so far enough have escaped martyrdom to fertilise the next. It would be ironic if we alone were efficient enough to make ourselves spiritually barren."

—SIR GEOFFREY VICKERS V C M A  
in *Lancet* p 524 March 12 1953

# SERUM GAMMA GLOBULIN IN THE BURNED PATIENT

With Special Reference to Septicemia

BERNARD BALIKOV *Captain MSC USA*

CURTIS P. ARTZ *Lieutenant Colonel MC USA*

DONALD F. SOLOMOTO *Specialist Third Class USA*

THE PRESSING problem of septicemia in the burned patient has been re-emphasized in a recent report by Liedberg and associates.<sup>1</sup> Because many antibodies are concentrated in the serum gamma globulin (GG),<sup>2,3</sup> it was believed that a study of changes in this protein fraction might aid in understanding some of the biochemical responses of a burned patient to septicemia. As a burn study center, this unit had material readily available. The following is a report on 19 patients who had burns ranging from minimal to lethal. Of these, 7 had septicemia, 11 did not, and in 1 septicemia was doubtful.

## MATERIALS AND METHODS

It was possible for many of the patients studied to be admitted to this unit within 24 hours after their injury because of an efficient air evacuation procedure set up by this organization. Only four patients were admitted 10 or more days postburn. All data were collected within a period of four months. The importance of these factors is that they allowed for essentially similar therapy for all patients studied. Since administration of fluids to the burned patient is intensive for at least several days following the trauma, differences in therapy could conceivably vary the results of a study, particularly on blood constituents. The therapeutic regimen followed on these patients was essentially that given by Reiss and associates.<sup>4</sup>

GG was assayed by a recently described method<sup>5</sup> which consists essentially of salt fractionation by the method of Volfson and associates<sup>6</sup> followed by a modification of the tyrosine color

---

From Surgical Research Unit, Brooke Army Medical Center, Fort Sam Houston, Tex. Capt. Balikov is now assigned to Walter Reed Army Institute of Research, Washington, D. C.

reaction of Greenberg<sup>7</sup> applied to the isolated protein Recoveres of GG added to serum or from artificial mixtures of albumin and globulin averaged about 85 per cent.<sup>8</sup> The precision of this method (twice the standard deviation) is  $\pm 0.14$  g per 100 ml of serum.<sup>9</sup>

Total protein (TP) was estimated by a procedure which was also based on the tyrosine color reaction of Greenberg. This method has been modified for adaptation to the Coleman Jr spectrophotometer by adjusting volumes of sample and reagents such that most readings fall in the center of the spectrophotometer scale when read at a wave length setting of 670 millimicrons. Thus 0.5 ml of serum is made up to 20 ml with isotonic saline. One ml of this solution is used for color development by addition of 22 ml of water exactly 1 ml of 5 normal sodium hydroxide and 1 ml of phenol reagent. One milliliter of a standard containing 0.1 mg of tyrosine in 0.1 normal hydrochloric acid is treated precisely as is the saline serum solution. The blank which is treated in the same fashion consists of 1 ml of isotonic saline.

All GG and TP analyses were done on serum from blood samples drawn after an overnight fast.

## RESULTS

Table 1 summarizes our results. The burn equivalence used is adapted from Bull and Squire,<sup>10</sup> who weight second degree involvement as equivalent to one fourth the severity of third degree involvement. This serves to define the over all seriousness of an injury in which there is both second and third degree burns.

The GG values in table 1 are presented as a scattergraph in figure 1 to demonstrate the initial drop to subnormal levels which is characteristically followed by a rise with increasing time postburn. Although the serum GG may be normal on day 0 (0.7 to 1.7 g per 100 ml of serum), sometime between day 0 and day 10 the level will tend to drop below normal at least for burns of a burn equivalence greater than 5. This level is taken as the cutoff point since a patient with a burn equivalence of 4 did not show this phenomenon although one with a burn equivalence of 6 did.

The one low GG value in the lower right hand corner of figure 1 was obtained on the 32d postburn day for that patient. The reason for such a low level at that late date is not apparent. This patient did not have septicemia and was doing well at the time the blood was drawn. Seven days prior to this sampling a GG level of 1.4 g per 100 ml of serum was found, and some 30 days later a value of 1.4 was again observed. Unfortunately no

TABLE 1 Serum gamma globulin levels and gamma globulin to total protein ratios related to extent of burn days postburn and septicemia

Burn equiva lence 3°+ 1/4 2°	Gamma globulin (g per 100 ml of serum)					Gamma globulin/total protein				
	Days postburn									
	0-7	8-14	15-21	22-28	29-35	0-7	8-14	15-21	22-28	29-35
4	1.4	1.4				0.19	0.18			
6	0.5 0.5	1.1		1.3		0.09 0.09	0.17		0.20	
8	0.7 0.6	1.0		1.3		0.12 0.12	0.17		0.21	
11	0.7		1.6	1.6		0.12		0.29	0.26	
12	1.0 0.7			1.6	1.8	0.19 0.14			0.22	0.25
14				1.4	0.2				0.24	0.03
19		0.7 0.9	1.3	1.4			0.13 0.16	0.22	0.18	
20			2.4	1.9	1.6			0.34	0.27	0.25
22		0.9		1.2	1.4		0.17		0.18	0.22
24	0.3 1.2 0.03	0.7				0.08 0.24 0.01	0.17			
24		0.2					0.05			
25		1.0	1.6 1.6 1.1	1.0	1.2		0.26	0.26 0.25	0.16	0.21
27				1.6	1.9			0.27	0.33	0.36
31		1.2		1.4 1.6	1.5		0.25		0.21 0.29	0.23
33	0.6 0.4	1.3	1.4 1.2	1.1 1.1	0.9	0.12 0.08	0.24	0.27 0.21	0.17 0.18	0.16
36		0.9		0.8	1.6		0.21		0.19	0.24
36	0.5					0.14				
45	0.6 1.2					0.14 0.30				
54	0.5	0.7				0.13	0.14			

Two results in one period indicate analyses on two different days within this period the upper value referring to the earlier day

\*Italicized results were obtained on samples drawn while a patient had septicemia

Dash lines are under results obtained on samples drawn from a patient with questionable septicemia

assays were taken shortly after obtaining the remarkably low value, and it remains an enigma

The ratio GG/TP (fig. 2) shows precisely the same relationship with days postburn as does GG alone (fig. 1)

On glancing at the GG values in table 1 for the period 0 to 7 days postburn, it appeared that levels were particularly low on patients with septicemia. However, since all values tend to be

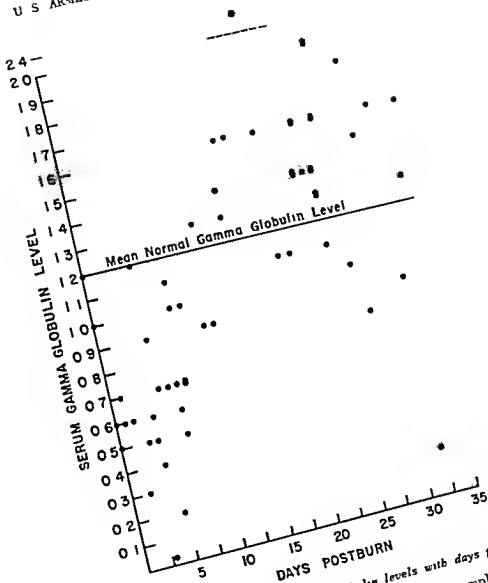


Figure 1 The change of serum gamma globulin levels with days postburn.

low during this period a statistical analysis was employed to determine the confidence one could place in this observation. Values obtained during the first 10 postburn days were analyzed according to the method described by Mainland<sup>1</sup> and the results are shown in table 2. The P value indicates a significant difference between the two groups at the 5 per cent level and leads to the conclusion that during the first 10 postburn days although low serum GG levels are to be expected these values will be still further depressed if septicemia is present.

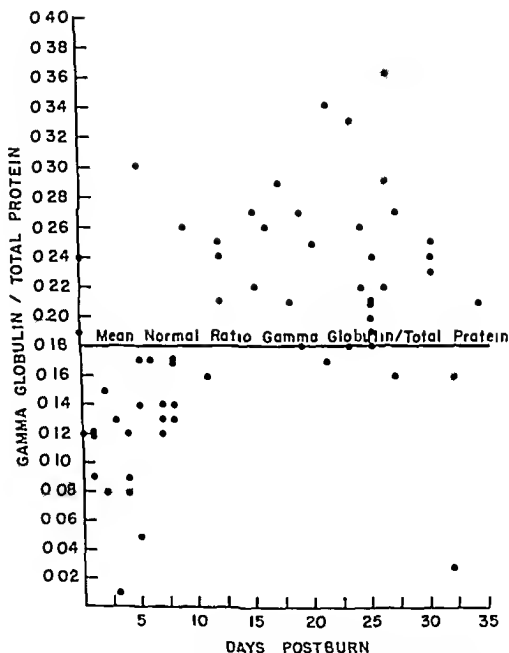


Figure 2 The change of the ratio (gamma globulin/total protein) with days postburn

An analysis of the GG/TP ratios identical to the above analysis of GG levels reveals the following

$$t=1.54$$

$$P\text{-between } 0.1 \text{ and } 0.2$$

This P value does not indicate a statistically significant difference between the two groups. It does, however, point to a likely tendency for ratios which, although low during the first 10 postburn days, may be still lower in the presence of septicemia.

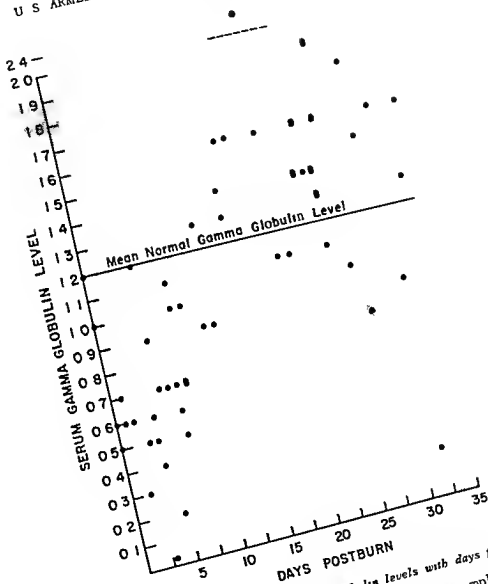


Figure 1 The change of serum gamma globulin levels with days postburn.

low during this period a statistical analysis was employed to determine the confidence one could place in this observation. Values obtained during the first 10 postburn days were analyzed according to the method described by Mainland<sup>1</sup> and the results are shown in table 2. The P value indicates a significant difference between the two groups at the 5 per cent level and leads to the conclusion that during the first 10 postburn days although low serum GG levels are to be expected these values will be still further depressed if septicemia is present.

The GG/TP ratios show no trends whatever when correlated with the seriousness of the burn, during any postburn period (table 3)

### DISCUSSION

The reason for the fall in serum GG levels during the first several days postburn is not known. Dilution subsequent to fluid therapy probably plays a role, but this would not explain the drop in the GG/TP ratio. Gjessing and Chnautin<sup>11</sup> noted a similar drop in the GG levels of burned rats and stated that this is also true in the dog. Prendergast, Feinichel, and Daly, although principally interested in GG levels some 15 to 20 days postburn, have recorded values earlier as well (using an electrophoretic procedure). A study of either their table or their graphs indicates precisely the trend noted above, namely, a drop in the serum GG sometime between day 0 and about day 10, followed by a rise to normal or above.

It is of interest that the GG/TP ratio also falls during this early postburn period. Since it is well known that the plasma TP concentration is depressed at this time, it must mean either that loss of the other protein fractions are lost or that some of these other protein fractions are more efficiently replaced than GG. If the answer is that less "other protein" is lost, it is not likely to be a leakage phenomenon since the GG molecule is among the largest of the protein fractions and so would be less rather than more likely to leak out of the vascular system. This differential loss, therefore, would be more readily explained on the basis of a more rapid metabolism of GG.

However, it is quite possible that the mechanism does not involve loss as much as it does replacement. Replacement can be accomplished either by infusion of protein solutions or by some in vivo metabolic process. Gjessing and Chnautin, in their work with burned rats, found a percentage fall in the plasma albumin and GG and a percentage rise in the alpha and beta globulin fractions (with reference to TP). These rats received no transfusions. This would increase the likelihood of a replacement phenomenon of the relatively more concentrated fractions being the result of some in vivo metabolic process rather than the result of therapeutic infusions. As an in vivo phenomenon, the cause can be either inadequate formation or inadequate distribution. The latter possibility is based on a preliminary report by Francis, Hawkins, and Wermall,<sup>12</sup> who present evidence for the presence of an extravascular antibody in the rabbit. Also, Miller and associates<sup>13,14</sup> report that in rats GG is formed almost exclusively in extrahepatic tissue. It is thus possible that, even though GG is formed, it does not find its way into the blood.



TABLE 2 *Effect of septicemia on serum gamma globulin levels*

	Septicemic	Nonsepticemic
Number of values	9	16
Mean GG level	0.5	0.9
Standard deviation	$\pm 0.34$	$\pm 0.38$
t		2.17
P		0.02-0.05

The work of Prendergast, Fenichel, and Daly<sup>12</sup> led us to seek a relationship between the burn equivalence as a measure of the seriousness of a burn and the serum GG level. The days post burn were divided into 7 day periods (table 1) and the mean GG for an equivalence of 20 and below was compared with the mean for equivalences of over 20, again by use of the *t* test. Contrary to the conclusions drawn by Prendergast, Fenichel, and Daly, it can be seen (table 3) that for every period except the one from 29 to 35 days the mean GG level for the low equivalence burns is actually greater than for the high equivalence burns.

TABLE 3 *Correlation of serum gamma globulin and gamma globulin to total protein ratios with extent of burn*

Days postburn	0-7		8-14		15-21		22-28		29-35	
Burn equivalence	20 and under	Over 20	20 and under	Over 20	20 and under	Over 20	20 and under	Over 20	20 and under	Over 20
Mean GG level	0.8	0.6	1.1	0.9	1.8	1.3	1.5	1.2	1.2	1.3
t			1.18		1.38		2.09		0.73	
P		0.3-0.4		0.2-0.3		0.2-0.3		0.05-0.1		0.4-0.5
Mean GG/TP ratio	0-14	0-14	0-16	0-19	0-28	0-25	0-23	0-22	0-18	0-24
t		0		1.35		0.82		0.41		1.25
P				0.2-0.3		0.4-0.5		0.6-0.7		0.2-0.3

there is a relationship between the increase in GG level and the severity of the burn. Contrariwise, we find a tendency for lower GG levels with increasing severity of burn (table 3). It is possible that this discrepancy is the result of differences in analytical methods. Prendergast, Fenichel, and Daly used an electrophoretic method, whereas we used a salt fractionation method. The principal difference in these methods is that we may be measuring approximately 15 per cent non GG protein as compared with electrophoretic separations. However, this "contaminant" is not dependent upon albumin concentration and so is presumably dependent only upon globulin changes.<sup>4</sup> Since Prendergast, Fenichel, and Daly found that other globulin fractions also increase with the GG (though not as markedly), it is believed that methodologic differences are not likely to contribute greatly to differences in findings. Nonetheless, one should not dismiss this possibility since, in the special case of a burned individual, these methodologic differences may be exaggerated.

It is also possible that the discrepancy in our findings is due, not to methodologic differences, but to differences in therapy. These workers<sup>4</sup> stress the use of repeated whole blood transfusions, whereas our regimen stresses administration of plasma expanders and large quantities of electrolyte solutions in addition to blood.<sup>4</sup> This difference is difficult to evaluate because of the large role usually played by clinical judgment in deciding on therapy for any particular patient. In general, the total proteins reported by Prendergast, Fenichel, and Daly for their serious burns are considerably higher than ours, so there is a good possibility that their therapeutic regimen does favor protein replacement more than does ours, and that this in turn contributes to the lack of agreement on relating GG levels to the severity of the burn.

Another variable is the classification of a burn with regard to seriousness of injury. The burn equivalence previously mentioned is an attempt to make this observation more objective. However, this system was used only by our group so that we cannot be sure that a burn called very serious by one group would be similarly listed by another. It was found that differences in handling data did not contribute to differences in findings. They analyzed their data by observation. We grouped their patients as four with "severe" and four with "less severe" burns (according to their own descriptive classification) and divided the GG data accordingly. The levels in each group were averaged and subjected to the *t* test. Differences between the groups were statistically significant (*P* value of between 0.02 and 0.05). To summarize, it would appear that differences between our results and the observations of Prendergast, Fenichel, and Daly are

stream To summarize the differential depression of the serum GG in the early postburn period is most likely due to one or more of three factors (1) a high rate of removal by some metabolic process (2) a low rate of formation or (3) inadequate movement of GG from extravascular to intravascular spaces

The additional drop in GG levels seen in the presence of septicemia occurring during the first 10 days postburn is surprising because normally one expects to find an increase in the presence of an infectious disease Since sodium is retained in such cases and since it is common practice to intensify administration of fluids to burned patients with septicemia dilution may again be a significant factor However simple dilution does not explain the tendency for the GG/TP ratio to fall It is possible that the initial low GG levels seen on all burned patients are related (in addition to a dilution phenomenon) to a stimulation for production of plasma GG to which the organism is already unable to respond Thus the additional stimulus of an infectious condition may be incapable of evoking an increased response In the usual situation even though the complex formed of an antigen antibody reaction *in vivo* may remove some circulating GG apparently the organism is stimulated to a further production of antibody resulting in a net increase of plasma GG Since the organism is incapable of such an increased production in the early stages of a burn the net effect of removing antibody GG by formation of an antigen antibody complex is to lower the GG level

From figure 1 it can be seen that the rise in GG with time postburn is characteristic not only of patients who recuperate but also of those whose condition deteriorates and who eventually die In this latter group are three patients who lived longer than 10 days (burn equivalences of 19, 27, and 33 of table 1) Although patient 13 did not have a GG assay until his 19th postburn day there seems no reason to believe his earlier GG levels would not have fallen into the usual low range With only three patients in this category one cannot draw conclusions with a great deal of assurance However it would appear that whatever the nature of the antagonism to the production of plasma GG in the immediate postburn period it is the result of the burn insult per se Thus despite other complications as the organism recovers from this shock it again becomes capable of responding to the demand for plasma GG

The above considerations may make it worthwhile for clinicians to consider the use of GG preparations as part of their therapeutic program during the immediate postburn period

As pointed out under "Results" we have been unable to confirm the observation by Prendergast, Fenichel, and Daly that

- 4 Reiss E, Skirman J A, Artz C P, Davis J H and Amaracher T H Fluid and electrolyte balance in burns *J A. M. A.* 152 1309-1313 Aug 1 1953
- 5 Balikov B and Solometo D F Gamma globulin levels in normal human serum. To be published in *Clin. Chim. Acta.*
- 6 Wolfson W Q, Cohn C, Calvary E and Ichiba F Studies in serum proteins: rapid procedure for estimation of total protein, true albumin, total globulin, alpha globulin, beta globulin and gamma globulin in 10 ml of serum *Am J Clin Path* 18 723-730 Sept 1949
- 7 Greenberg D M Colorimetric determination of serum proteins *J Biol Chem* 82 545-550 May 1929 Cited in Hawk P B, Bergheim O, Oser B L and Cole A G *Practical Physiological Chemistry* 11th edition P. Blakiston's Son & Co Philadelphia Pa 1937 pp 455-456
- 8 Bull J P and Squire J R Study of mortality in burns unit: standards for evaluation of alternative methods of treatment *Ann Surg* 130 160-172 Aug 1949
- 9 Mainland D *Elementary Medical Statistics: The Principles of Quantitative Medicine* W B Saunders Co Philadelphia Pa 1952 p 156
- 10 Prendergast J J, Fenichel R L and Daly B M Albumin and globulin changes in burns as demonstrated by electrophoresis *A. M. A. Arch. Surg* 64 733-740 June 1952
- 11 Gjessing E C and Chanarin A. Electrophoretic study of plasma and plasma fractions of normal and injured rats *J Biol Chem* 169 657-663 Aug 1947
- 12 Francis G E, Hawkins J D and Wormald A Extravascular antibody *Proc Biochem Soc London* 334th meeting 12 Nov 1954 (issued with *Biochem J*) 59 vii Jan 1955
- 13 Miller L L and Bale W F Synthesis of all plasma protein fractions except gamma globulins by liver: use of zone electrophoresis and lysine-C14 to define plasma proteins synthesized by isolated perfused liver *J Exper Med* 99 125-132 Feb 1954
- 14 Miller L L, Bly C G and Bale W F Plasma and tissue proteins produced by non-hepatic rat organs as studied with lysine-C14: gamma globulins, chief plasma protein fraction produced by non-hepatic tissues *J Exper Med* 99 133-153 Feb 1954

---

'The true aim of the teacher should be to impart an appreciation of method rather than a knowledge of facts' for method is remembered when facts have been forgotten "

—G W PICKERING M D  
in *British Medical Journal*  
p 116 July 21 1956

probably due to differences in therapy with contributions to this discrepancy from differences in method and from lack of standardization in classifying the severity of the injury

It has been pointed out that there is a statistical difference between the GG levels of patients with and those without septicemia during the first 10 postburn days. One may ask if this drop in GG level is a sensitive index of septicemia. The mean for the nonsepticemic group is 0.9 g per 100 ml of serum with a range (twice the standard deviation) of from 0.1 to 1.7. Thus a value must be 0.1 or less to be a statistically significant indication of septicemia. However the mean for the septicemic group is 0.5 with a range of from 0 to 1.2 so that there is a considerable overlap of values. Therefore during the first 10 postburn days a GG level of 0.1 or less is most likely related to septicemia but levels between 0.1 and 0.5 must be considered doubtful. Since very few values on patients with septicemia are 0.1 or less (table 1) this test cannot be considered a sensitive index of septicemia.

#### SUMMARY

During the first 10 postburn days, there is a tendency for serum GG levels to drop below normal in burns classified as having a burn equivalence greater than 5.

If septicemia is present during the first 10 postburn days the serum GG level will tend to be exceptionally low. Values as low as 0.1 g per 100 ml of serum or less are usually associated with septicemia. However a low GG concentration is not a sensitive index of septicemia.

There is a tendency for the ratio GG/TP to be low during the first 10 postburn days particularly in the presence of septicemia. The significance of this observation is discussed.

After the first 10 postburn days the serum GG concentration will increase regardless of whether the condition of the patient improves or deteriorates.

No relation can be found between the seriousness of a burn as determined by the burn equivalence and either GG values or GG/TP ratios at any stage of a burned patient's recovery. The reasons for the disagreement between this finding and the reports of other workers are discussed.

#### REFERENCES

1. L. J. Berg, N. C. F. Reiss, E. and Arz, C. P. Infection in burns: septicemia common cause of death. *Surg. Gynec. & Obst.* 99: 151-158, Aug. 1954.
2. Enders, J. F. Concentration of creatinine in blood serum in relation to the burn. *Am. J. Clin. Invest.* 23: 510-530, July 1944.
3. T. Elus, A. and Kabat, E. A. Electrophoretic study of human serum and purified antibody preparations. *J. Exper. Med.* 69: 119-131, Jan. 1939.

March 1957)

## PART A: B PERFORMANCE

977

2 *Double names* Four double names were given, and then only the surnames were repeated in a different order, while the subject had to write down the first names (fig. 1f)

3 *Object number* An object was given with a number, and then the object only was repeated in a different order, while the subject had to write down the corresponding number (fig. 1g)

### Time Perception Tests

In a third group of experiments time perception was tested

1 *Free estimate* The subject had to estimate an interval of one minute, and the actual time was recorded

2 *Tapping* The subject had to tap out 60 seconds on a counter, and the actual time was again recorded "

### Muscular Co-ordination Tests

The fourth group of tests involving muscular co-ordination was as follows

1 *Passing ball* A small rubber ball was passed through a 1 foot long tube, which had a slight elastic contraction at the end, so that the ball was stopped but could be pressed out easily. The number of passes per 30 seconds was determined

2 *Punchboard* A plastic board had three holes arranged as a unilateral triangle with a side length of 4 inches. A metal stylus fitted the holes and a shoulder stopped the punch at a depth of 3/16 inch. The number of punches per 30 seconds was counted

3 *Rotary pursuit device* The subject had to follow with a stylus an irregular line on a rotating kymograph. The mistakes were automatically recorded on an Esterline Angus armeter

### Reaction Time Tests

Reaction time was tested two ways

1 *Simple reaction time* A 360 millisecond time clock was arranged with two interruption switches. The operator started the clock. The subject, when seeing the hand of the clock moving, stopped it by pressing his switch

2 *Choice reaction time* The same arrangement as in simple reaction time was used. However, this time the subject was told to respond only to one of two sounds of slightly different frequencies. The reaction time and the number of false reactions were recorded

### Reflex Activity

*Patellar reflex* was determined by having a percussion hammer mounted as a pendulum and moving through a fixed arc hit the

2 Number or letter groups In this test four groups of numbers or letters were given of which three had a common pattern. The subject had to cross out the one that did not fall in line (fig 1B)

3 Number or letter sequence In this test each group had a periodically repeated pattern and the subject had to fill in the letter or number that would follow logically if the pattern were maintained (fig 1C)

4 Code substitution Three lines were given and the fourth one had to be filled in. The first line consisted of the alphabet in order. In the second line numbers were given corresponding to each letter. The third line gave an arbitrary combination of letters and the corresponding numbers had to be filled in from the code given in the upper two lines (fig 1D)

<u>A</u>		<u>B</u>	<u>C</u>	
386	saw	8642	BDFH	ASBTAUBVA (W)
385	sat	7531	ACEG	31341451 (5)
683	was	6430	EGIK	
		9753	CEFI	

<u>D</u>	<u>E</u>	<u>F</u>
ABCDEFGHIJK--	John Baker	Table 57
81635901748--	Mary White	Paper 81
PAINSTIMULA -		

Figure 1 Six of the mental tests used.

5 Crossing "E" A page of printed matter was given and all E's had to be crossed out.

Tests 1 through 5 were evaluated in two ways (1) The number of problems attacked within the given time period was totaled and (2) the number of mistakes was counted.

#### Tests Involving Memory

The second group of tests involving memory was as follows

1 Repeating digits Numbers were given increasing from 4 to 9 digits which the subject had to write down after a short interval.

TABLE 2

THE EFFECT OF PAIN ON THE ACCURACY OF MENTAL  
PERFORMANCE (24 subjects)

	No. Tests	Type of Pain	Time (sec)	Pain-free	Control	1	2	3	4
Number and letter groups	24	Ice water	40	100	100	100	100	100	100
Number and letter sequence	24	Ice water	40	100	100	100	100	100	100
Cross word puzzle	24	Press cuff	40	100	100	100	100	100	100
Code substitution	36	Ice water	40	100	100	100	100	100	100
Code substitution	27	Press cuff	100	100	100	100	100	100	100
Code substitution	22	Headgear	100	100	100	100	100	100	100
Crossing out I	40	Ice water	40	100	100	100	100	100	100
Crossing out II	32	Press cuff	40	100	100	100	100	100	100
Crossing out III	32	Headgear	40	100	100	100	100	100	100

The numbers in the column of the number of mistakes are the number of mistakes made by the subjects in the control condition. The numbers in the column of the number of mistakes made by the subjects in the pain condition are the number of mistakes made by the subjects in the pain condition. The numbers in the column of the number of mistakes made by the subjects in the pain condition are the number of mistakes made by the subjects in the pain condition.

TABLE 3

THE EFFECT OF PAIN ON THE ACCURACY OF MENTAL  
PERFORMANCE (24 subjects)

	No. Tests	Type of Pain	Time (sec)	Pain-free	Control	1	2	3	4
Number and letter groups	36	Ice water	40	100	100	100	100	100	100
Cross word puzzle	24	Press cuff	40	100	100	100	100	100	100
Number and letter sequence	36	Ice water	40	100	100	100	100	100	100
Code substitution	36	Ice water	40	100	100	100	100	100	100
Code substitution	32	Press cuff	100	100	100	100	100	100	100
Code substitution	32	Headgear	100	100	100	100	100	100	100
Crossing out I	40	Ice water	40	100	100	100	100	100	100
Crossing out II	32	Press cuff	40	100	100	100	100	100	100
Crossing out III	32	Headgear	40	100	100	100	100	100	100

Pain and control values refer to number of mistakes and standard error of the difference.



tendon with controlled force. The movement was registered by fixing a string to the heel which was then converted into vertical movement and registered on a kymograph.

**Skin flare.** The threshold of skin flare was determined with an electrically heated probe. The meter reading of the first skin flare reaction was recorded.

#### Work Performance, Respiratory Function and Pulse Rate

Finally, the effect of pain on rate of performance and mechanical efficiency on a stationary ergometer bicycle was determined. Respiratory measurements were made with a Hutchinson respirometer. For the oxygen analysis a Beckman model D oxygen analyzer was used. Work was determined as revolutions per 90 seconds on the ergometer bicycle (Kellso 19). Data were collected during a 90 second pre-exercise period for respiratory rate, respiratory minute volume, oxygen concentration of expired air, and pulse rate. Recordings were continued during the 90 seconds of exercise. The postexercise period started 30 seconds after the end of exercise and lasted for 90 seconds. Pulse rate was determined 30, 90 and 150 seconds after the end of exercise and all respiratory data were collected as above. Pain was produced only during the exercise period while in the control runs the physical conditions were the same but the painful stimulus was omitted.

### RESULTS

Table 2 gives the results of the first five tests on rate of mental performance. Part of the values are given as the number of problems solved in a given time period and part of them as the time needed to solve a given number of problems. In all tests there is a tendency for the rate of performance to be lower in the presence of pain, but this difference is not significant. Even if all test scores are combined there is no significant difference between the pain and no-pain conditions at the 5 per cent level of confidence.

Table 3 gives the combined results for all tests on accuracy of performance: the number of mistakes. We can divide this table into two groups of tests. In the first six tests the intensity of pain is directly related to the degree of interference, while in the last three tests even a mild pain causes a significant decrease in performance. All of the first six tests probably involve more of a mental effort than the simple crossing out of "f" of the last group. Higher and lower mental tasks are used in the same sense as intelligence tests are used to determine mental development in children. It is believed that in these higher mental tasks the subject concentrates so much on the problem that he ignores a mild pain, and interference appears only when the pain is of such

TABLE 5							
THE EFFECT OF PAIN ON MUSCULAR COORDINATION (26 subjects)							
Type of Test	Type of Pain	No tests	Pain	Control	s e d	t	p
Passing ball	Ice water	36	70.6	73.3	1.46	1.86	0.10
Punchboard	Ice water	36	112.6	117.0	2.25	2.35	0.05
Punchboard	Press cuff	32	113.2	116.8	1.98	1.82	0.10
Punchboard	Headgear	32	113.2	118.1	1.32	0.68	> 0.10
Rotary pursuit	Ice water	36	8.97	8.99	1.35	2.96	0.01
Rotary pursuit	Press cuff	44	7.52	5.13	1.08	2.21	0.03
Rotary pursuit	Headgear	40	5.87	5.13	0.96	0.74	> 0.10

Pain and control values for passing ball and punchboard refer to number of tasks per 90 seconds for rotary pursuit to number of mistakes. s e d = standard error of the difference.

As far as reaction time is concerned (table 7), no significant results were obtained with simple reaction time. However, in the choice reaction time there was a significant increase with pain from cold while the number of mistakes was unchanged. As far

TABLE 7							
THE EFFECT OF PAIN FROM ICE WATER ON REACTION TIME							
	No Subjects	No tests	Pain (msec.)	Control (msec.)	s e d	t	p
Simple reaction time	18	540	185.9	177.2	5.85	1.49	0.50
Choice reaction time	13	256	292.0	273.6	7.31	2.62	0.03

as the effect of pain is concerned, there is some support for Lemmon's<sup>10</sup> findings that simple reaction time parallels memory and choice reaction time parallels reasoning. The tests on the patellar reflex did not produce any significant results (table 8).

TABLE 8							
THE EFFECT OF PAIN FROM A PRESSURE CUFF ON REFLEX ACTIVITY							
	No Subjects	No tests	Pain	Control	s e d	t	p
Patellar reflex	11	165	8.5	10.4	1.35	1.65	0.10
Skin flare	12	24	51.8	49.0	0.87	3.22	0.01

cm meter reading

The skin flare threshold was significantly increased in the presence of pain (table 8). This might be an indication of a peripheral

intensity that it cannot be ignored. However if not much mental effort is required, then even a mild pain causes sufficient distraction to affect performance.

Table 4 gives the effect of pain on memory tests. No significant effect of pain was observed. In these tests pain was applied during the period of retention and during the recall period. Therefore the data indicate that neither of these two components of memory are affected by pain.

TABLE 4 THE EFFECT OF PAIN FROM ICE WATER ON MEMORY						
Typ of Test	Sbjcts	Trials	Pain	Control	S.D.	d
R.P. at 9 digits (49)	15	25	5.88	5.04	0.73	> 0.10
Double Names	12	14	1.89	1.75	0.78	> 0.10
Object Number	12	12	1.84	1.85	0.27	> 0.10

$d = \frac{\text{Pain} - \text{Control}}{\text{S.D.}}$   
Standard error of the difference

When time was determined by tapping out 60 seconds, no difference between pain and control was found. When the subject was asked to estimate one minute, there was a significant increase with pain due to cold. This is considered an indication of over compensation for the apparently slow passage of time in the presence of pain (table 5).

TABLE 5 THE EFFECT OF PAIN FROM ICE WATER ON TIME ESTIMATION						
(1 min)						
Typ of Test	Sbjcts	Trials	P (sec)	C (sec)	S.D.	d
Tapping	16	16	64.3	69.5	5.23	0.99
Free Estimate	16	16	73.9	65.6	8.88	2.14

In the tests on muscular coordination (table 6) it was found that the degree of interference in the presence of pain varied with the type of test. Passing the ball is a very easy test, and here no significant effect was observed even during a 4 dol pain. The punchboard test requires more precision and here the effect of pain is barely significant. The rotary pursuit device, which is still more refined as far as coordination precision steadiness and attention are concerned, showed a highly significant degree of interference. This differentiation as to the degree of refinement of these tests is used in the same way as tests of muscular coordination are used to determine the performance level of children. Considering the three different pain intensities used in these tests, it becomes clear also that the degree of interference depends on the pain intensity being used.

TABLE 11  
THE EFFECT OF PAIN ON TIDAL VOLUME  
(24 subjects)

## A During Exercise

Type of Pain	No Tests	Pain (ml)	Control (ml)	s e d	t	p
Ice water	36	1 573	1 670	128	0 76	> 0 10
Pressure cuff	24	1 883	1 923	102	0 39	> 0 10
Headgear	36	1 904	1 923	89	0 21	> 0 10

## B After Exercise

Type of Pain	No Tests	Pain (ml)	Control (ml)	s e d	t	p
Ice water	36	1 561	1 421	92	1 56	> 0 10
Pressure cuff	24	1 758	1 652	94	1 13	> 0 10
Headgear	36	1 654	1 652	54	0 04	> 0 10

s e d = standard error of the difference

TABLE 12  
THE EFFECT OF PAIN ON RESPIRATORY MINUTE VOLUME  
(24 subjects)

## A During Exercise

Type of Pain	No Tests	Pain (ml)	Control (ml)	s e d	t	p
Ice water	36	36 651	34 064	705	3 44	0 01
Pressure cuff	24	49 900	44 421	1 112	4 93	0 01
Headgear	36	45 315	44 421	504	1 77	0 10

## B After Exercise

Type of Pain	No Tests	Pain (ml)	Control (ml)	s e d	t	p
Ice water	36	30 440	24 578	983	4 95	0 01
Pressure cuff	24	36 918	32 214	1 054	4 46	0 01
Headgear	36	33 411	32 314	822	1 46	> 0 10

TABLE 13  
THE EFFECT OF PAIN ON OXYGEN CONCENTRATION  
(24 subjects)

## A During Exercise

Type of Pain	No Tests	Pain (%)	Control (%)	s e d	t	p
Ice water	36	16 8	16 7	0 08	1 81	0 10
Pressure cuff	24	17 5	17 1	0 09	4 44	0 01
Headgear	36	17 2	17 1	0 08	1 81	0 10

## B After Exercise

Type of Pain	No Tests	Pain (%)	Control (%)	s e d	t	p
Ice water	36	18 2	18 3	0 06	1 21	> 0 10
Pressure cuff	24	19 0	18 9	0 07	1 43	> 0 10
Headgear	36	18 8	18 9	0 07	1 43	> 0 10

s e d = standard error of the difference

inhibitory effect of pain as indicated by the recent findings of Galambos Sheatz and Vernier.<sup>1</sup> However, at present we cannot be sure whether this is not purely a vasoconstrictor effect due to epinephrine released under stress.

Table 9 shows that pain does not affect work performance as measured with an ergometer bicycle under these experimental conditions. Table 10 shows that the respiratory rate was increased in pain during but not after exercise while the tidal volume (table 11) shows no significant change the respiratory

TABLE 9 THE EFFECT OF PAIN ON WORK PERFORMANCE (bicycle ergometer 24 ujo t)					
Type of Pa	no t 5t	Pa	CO tr l	d	t
Ice water	36	390.8	398.7	8.16	1.80
P n s r uff	24	311.5	336.2	3.14	1.69
Headgear	36	343.5	341.1	2.02	0.20

Pa n s d c tral at 3 refer to re al t o p r 90 s d The  
per m nt n l i were performed n m d t and those 1  
2 and 3 n mld mmer t d = st d rd afr r of th d if ence

TABLE 10 THE EFFECT OF PAIN ON THE RESPIRATORY RATE (24 s p) 1s)					
Type of Pa	Test	P in	C tr l	s d	p
Ice at r	36	23.9	20.4	1.35	2.51
Pressure cuff	24	26.5	23.1	1.38	2.21
Headgear	36	23.8	23.1	0.89	0.97

minute volume (table 12) is markedly increased during as well as after exercise. Oxygen concentration is changed only in the pain produced by the pressure cuff during exercise (table 13). Oxygen consumption during exercise is the same with or without pain but when pain is present during exercise the oxygen consumption is markedly increased during the postexercise period (table 14). Also under those conditions postexercise pulse rate is significantly increased (table 15). None of the above changes can be seen in the experiments with mild pain induced by the headgear. The findings are considered an indication that for

This does not mean that the process underlying the individual performance tests is necessarily different, and the point of interference in the presence of pain might well be common to all of them. However, it is believed that with our present state of knowledge no conclusion regarding any specific type of performance can be drawn without testing this particular performance directly. The results show also a different type of response to pain for these two groups of tests.

In addition to these limitations, there are some specific restrictions due to the particular methods used in this investigation.

- 1 The subjects of these experiments were a selected group, limited in age and sex. This was done intentionally to get sufficient uniformity so that the data could be analyzed statistically.

- 2 The subjects for these experiments were volunteers. Probably in a volunteer group the fear of pain is not as pronounced as in the general population. Closely associated with the fear of pain are the emotional component of pain and the reaction to pain which, then, in our selected group are probably less pronounced than in the rest of the population.

- 3 In these tests we used only experimentally induced pain in which the subject is fully familiar with the cause of the pain. He knows how long the pain will be present, and that no danger is connected with it. Therefore, the threat content of this is not as marked as that of pain from disease or trauma of identical intensity.

All of these factors tend to decrease possible effects of pain on performance as measured in this study. Therefore, what is not significant in our results may become significant under less restricted conditions. However, it is unlikely that any significant changes found here might not hold up in a less selected group.

Another difficulty in the interpretation of our results is the problem of pain intensity. We used in these tests three different types of pain, which clearly represent three different pain intensities. However, they differed in other respects as well as in pain intensity. Therefore, any interpretation of the effect of pain intensity must be made with this limitation in mind.

#### SUMMARY

Using various types of pain stimuli and taking each subject as his own control, the following observations regarding the effect of pain on performance were made:

- 1 Tests involving primarily memory and the speed of performing various mental tasks are not affected by simultaneous pain.

- 2 In tests involving simple mental tasks, the number of mistakes is increased in the presence of pain, and this increase

short periods of exercise pain does not affect the amount of work performed. However the effects on the respiratory and cardiovascular system show that the efficiency of performance is decreased.

TABLE 14  
THE EFFECT OF PAIN ON OXYGEN CONSUMPTION  
(24 subjects)

A During Exercise						
Type of Pain	No Tests	Pain (cc/min)	Control (cc/min)	s.d.	t	p
Ice water	36	153	1465	38	1.93	0.10
Pressure cuff	24	1746	1732	44.2	0.32	> 0.10
Handgrip	36	1718	1732	39.8	0.35	> 0.10
B After Exercise						
Ice water	36	846	69	38.1	4.04	0.01
Pressure cuff	24	738	677	29.8	2.05	0.05
Handgrip	36	735	677	4	1.97	0.10

TABLE 15  
THE EFFECT OF PAIN DURING EXERCISE ON THE POSTEXERCISE PULSE RATE (1/2 1 1/2 2 1/2 m 24 subjects)

Type of Pain	No Tests	1/2	1	1 1/2	2	2 1/2	s.d.	t	p
Ice water	36	118.5	115.7	103.0	101.9	88.3	1.33	2.11	0.05
Pressure cuff	24	120.1	116.2	109.2	105.8	92.2	1.02	2.12	0.05
Handgrip	36	117.3	116.2	106.1	105.8	89.3	1.01	1.19	> 0.10
									0.01
									0.02
									0.10
									> 0.10
									> 0.10
									> 0.10

s.d. = standard error of the difference

## DISCUSSION

In this study certain changes of performance in the presence of pain were demonstrated. However this is no indication that the subject's capability to perform such a task is impaired. The results might be explained equally well by lack of concentration. This study deals with pain and the resulting changes of performance without any attempt to determine any of the intermediate steps or mechanisms.

A variety of tests was used in this investigation, some of a more physical character and others of a more mental character.

- 15 Diethelm O and Jones M R Influence of anxiety on attention learning retention and thinking *Arch Neurol & Psychiat* 58 325-336 Sept 1947
  - 16 Fedotov I P Action of painful stimulation on reflex activity of spinal cord Report 3 The Influence of Painful Stimulation on the Patellar Reflex *Fiziol Zh SSSR* 36 436-444 1950 abstract *Psychol Abstr* 26 203 No 1926 1952
  - 17 Hines F A Jr and Brown G E Standard stimulus for measuring vasomotor reactions its application in study of hypertension *Proc Staff Meet Mayo Clin* 7 332 335 June 8 1932
  - 18 Steinberg H Changes in time perception induced by an anaesthetic drug *Brit J Psychol* 46 273 279 Nov 1955
  - 19 Kelso L E A and Hellebrandt F A Recording electrodynamic bicycle ergometer *J Lab & Clin Med* 19 1105 1113 July 1934
  - 20 Lerrnon V W Relation of reaction time to measures of intelligence memory and learning *Arch Psychol* No 94 13 Nov 1927
  - 21 Gafambos R Sheatz G and Vernier V G Electrophysiological correlates of conditioned response in cats *Science* 123 376-377 Mar 2 1956
- 

### PROGRESS IN PREVENTIVE MEDICINE

"The progress of medicine is strikingly revealed when the present is compared with the past. The life expectancy of an infant at birth in the early days of the United States was actually less than the age at which the medical student of today completes his formal education. He can afford to prolong his schooling far beyond what would once have been considered reasonable because the duration of his expected productive period has been so greatly prolonged.

The importance of preventive medicine is appreciated only if one recalls the pestilences and similar calamities of the past. Further reduction of the mortality and morbidity from accidents is obviously possible. The prevention of such conditions as arteriosclerosis and hypertension will be more difficult."

—JAMES WATT M D

in *Journal of the American Medical Association* p 1351 Aug 4 1956



appears to be independent of the pain intensity (up to 4 or 5 dols)

3 In tests involving higher mental tasks, the number of mis takes is increased and this increase corresponds roughly to the pain intensity

4 Time estimation is increased which is considered an over compensation for the apparently slow passage of time in pain

5 Pain impairs the performance in tests of muscular co-ordination. The degree of interference apparently increases with the pain intensity and also with the degree of refinement of the task to be performed

6 Simple reaction time is not affected by simultaneous pain while choice reaction time is prolonged

7 The mean amplitude of the patellar reflex is not significantly affected by pain while the threshold of the skin flare reaction is significantly raised

8 In short tests of work performance the total work is not significantly altered by simultaneous pain. However the efficiency of performing the work as indicated by changes of the cardiovascular and respiratory system, is markedly decreased by simultaneous pain

# REFERENCES

- 1 Hardy J D, Wolff H G and Good H H *Pain Sensations and Reactions*. Williams & Wilkins Co Baltimore Md 1952 pp. 146-172, 292-297
- 2 Leary J L and VanLehn R *Differential response to the experimental study* *Psychosom. Med.* 14 71-81 Mar-Apr 1952
- 3 Milne R B, Shaggs C. S. and Davies F H *Spill city of body reaction and stress in Association of the Association of Nervous and Mental Diseases* *Life Stress and Bodily Disease* proceedings of the Association of Nervous and Mental Diseases, Vol 29, Williams & Wilkins Baltimore Md 1949
- 4 Medved V C *The Mental and Physical Effects of Pain*. Bookton Brwn Pt x Essay Harvard Society of London 1948 E. S. L. van der Edinburg Scotland 1949
- 5 Beebe-Christ J G *The Psychology of Pleasure and Unpleasantness*. D. Van Nostrand Co Inc New York N Y 1932
6. B. H. R. J. *Pain, D. Appleton, and Co. New York N Y 1915*
- 7 Cannon W B *Body Changes in Pain, Hunger, Fear and Rage* 2d ed. D Appleton-Century Co Inc New York N Y 1929
- 8 Lantz C. M. *Some Dynamic Aspects of Success and Failure* *Psychological Monographs* Vol 59 No 1 whole No 271 directed by J. H. F. Dashill American Psychological Association 1945
- 9 Lazarus R. S. *On the Subject of the Effect of Psychological Stress*. Informal Memorandum of the American Psychological Association, Vol 49, 293-317 July 1952
- 10 Lindsley D. B. *A Study of Performance Under Spilled Stress*. Informal Memorandum No 28 Sept 10 1945 NDRC Project SC 70 NS-146
- 11 Lewin T. *Pain*. The Macmillan Co New York N Y 1942
- 12 Troland L. T. *Fundamentals of Human Motivation*. D. Van Nostrand Co Inc New York N Y 1928
- 13 Burt H. E. and Tuttle W. W. *Patellar tendon reflex and affect* *Am. J. Psychol.* 36: 553-561 Oct 1925
- 14 Deese J. L. *Stress*. R. S. and Kennan J. *Anxiety and its reduction and its in learning* *J. Exper. Psychol.* 46: 55-60 July 1953

establish conclusively a cause and effect relationship between the examination data and the predictions because unrecorded perceptions and impressions may have played a major role in the final judgment of at least some of the psychiatrists. However, if it can be demonstrated that certain elements of the family history, preservice adjustment, or clinical impression regularly influenced the psychiatrists to make erroneous deductions of future duty performance, this knowledge could be used to improve psychiatric screening techniques.

### METHOD

Items of the psychiatric examination, psychiatric predictions, and performance ratings were coded and punched on standard electric accounting machine cards and correlations made. Differences in predictions among the six psychiatrists who participated in the study were explored. For simplicity, the only prediction used was prediction for service in a noncombat area, however, relatively little variation was noted between predictions for combat duty and those for noncombat assignment.

### RESULTS

An obvious over all result should be noted before any details are given. The psychiatrists predicted satisfactory performance for only 76 per cent of the sample, whereas 89 per cent rendered adequate service. This underestimation of satisfactory performance indicates that the psychiatrists tended to overemphasize unfavorable aspects of histories, interview impressions, or other examination findings.

**Family History** In estimating potential adaptability, it is common for psychiatrists to be negatively influenced by a history of unfavorable or traumatic circumstances in the early formative years. Table 20 illustrates the relationship of adverse childhood situations to psychiatric predictions of future effectiveness and to ratings of actual performance. The results indicate that the psychiatrists participating in this study were only mildly influenced by the past environment. When the individual categories are compared with the over all group it will be noted that there were six categories which had a P value indicating a significant difference (using .05 level of confidence) from the entire group in the percentage *predicted* to give satisfactory duty. Only two of these categories had a P value indicating a significant difference from the total group in the percentage who *performed* satisfactory duty. One may conclude from these findings that major sources of error in psychiatric prediction cannot be charged to an overemphasis on unfavorable childhood events as deleterious to successful military duty, although admittedly there was some overweighting of the importance of religion and the mother-child relationship.

# PSYCHIATRIC PREDICTION AND MILITARY EFFECTIVENESS

## Part III \* Factors Influencing Psychiatrists

ALBERT J GLASS Colonel MC USA  
FRANCIS J RYAN Captain, NSC USA

ARDIE LUBIN Ph D  
C V RAMANA

ANTHONY C TUCKER Colonel NSC, USA

A STUDY reporting the ability of psychiatrists to forecast the future military usefulness of recent inductees was initiated in 1951<sup>1,2</sup>. In that study 500 randomly selected basic trainees were evaluated by military psychiatrists at six Army training centers. Findings of the psychiatric examinations were recorded on standardized forms to facilitate a uniform collection of data which in addition to a narrative summary in each case included (1) background information and preservice adjustment (2) the early formative environment and preservice adjustment (2) clinical impressions of the psychiatrist as to the degree of psychopathology if any and the intelligence level and (3) the psychiatrist's estimation of the subject's future military effectiveness when assigned to a combat zone or to a noncombat area.

After the subjects had completed two years of Army service their performance of duty was rated from personnel and medical records and compared with the psychiatrists' predictions that were made early in basic training. Results clearly indicated that experienced military psychiatrists were unable to efficiently identify the potentially unsatisfactory soldier.

This report represents an effort to explore some of the causes for error in psychiatric prediction by determining which items of recorded information that were available to the psychiatrists had the largest apparent influence upon their estimation of the subjects' later military usefulness. Such an investigation could not

Part I and II were published in the October and November 1956 issues of this Journal.  
From Walter Reed Army Institute of Research, Washington, D. C.

Table 21 demonstrates the relationship of faulty preservice adjustment to psychiatric prediction and performance. A rating of questionable or impaired preservice adjustment was scored on the basis of the following criteria:

TABLE 21 *Relationship of preservice adjustment to prediction and performance*

Category	Totals	Satisfactory duty			
		Predicted		Performed	
		Per cent	P value	Per cent	P value
Entire group	305	76		89	
Questionable or impaired adjustment to					
Community	36	28	.001	67	.001
Work	71	32	.001	77	.001
Social and recreational activities	79	46	.001	80	.01
School	152	49	.001	80	.001
Parental family	86	56	.001	80	.01
Sex	124	69	.05	89	ns

P values indicate the statistical significance of the differences between the per centages of individual items of prediction and performance and the percentages of their respective total groups.

*Community* Delinquency, overt crimes, or troublemaking short of criminal behavior (alcoholism, public brawling, et cetera)

*Work* Inability to maintain steady employment (floating from job to job), inadequacy, or continued difficulties with employers or employees

*Social and recreational activities* Seclusive, overly aggressive or hostile behavior or absence of recreational life

*School* Consistent pattern of failure repeated truancy, or serious disciplinary difficulties

*Parental family* Repeated running away from home, incessant quarrels with parents, or excessive dependency upon family

*Sex* Repressed sexual drive (manifested by lack of sexual activity and overly moral attitudes), excessive preoccupation with sex or persistent overt homosexual drives

It is evident from table 21 that, as usual, psychiatric prediction was strongly influenced by disturbances in preservice adjustment.

## U S ARMED FORCES MEDICAL JOURNAL

TABLE 20 Relationship of family history to prediction and performance

Category	Totals	Satisfactory duty			
		Predicted		Performed	
		Percent	P value	Percent	P value
Entire group	505	76		89	
Psychosis new onset or previous	48	54	001	73	001
Alcohol disorder of siblings	75	59	001	81	05
Psychosis neurosis or personality disorder of mother	66	67	1	83	2
Psychosis neurosis or personality disorder of father	68	66	1	84	3
Overt sibling alcohol	224	67	001	84	01
Marginal or relief economic status of parents					
Death of one or both parents	148	72	3	80	5
Severe chronic illness of one or both parents	126	74	7	84	1
Moderate to marked parental disharmony	197	69	01	87	3
Religion not a positive force in the home	103	59	001	83	1
Overt schizophrenia or emotional ambivalence toward mother	121	72	3	86	4
Overt schizophrenia or emotional ambivalence toward father	177	69	01	84	3
Extreme disciplinary permissiveness or ambivalence of mother	194	73	3	85	3

P values indicate the statistical significance of the differences between the percentages of individual members of predicted and performed groups respectively for 1st group

**Preservice Adjustment** Probably the most frequently used indicator of future effectiveness is past performance. In this connection adjustment to school and work, social and recreation habits, and degree of conformity to community customs are considered to represent reliable patterns of behavior that are likely to be repeated even under quite different circumstances. This from both a common sense viewpoint and personality theory previous adaptability is used as a rational basis for acceptance or rejection by employers' admission to college promotion even financial risk.

Table 21 demonstrates the relationship of faulty preservice adjustment to psychiatric prediction and performance. A rating of questionable or impaired preservice adjustment was scored on the basis of the following criteria:

TABLE 21 Relationship of preservice adjustment to prediction and performance

Category	Totals	Satisfactory duty			
		Predicted		Performed	
		Per cent	P value	Per cent	P value
Entire group	505	76		89	
Questionable or impaired adjustment to					
Community	36	28	001	67	001
Work	71	32	001	77	001
Social and recreational activities	79	46	001	80	01
School	152	49	001	80	001
Parental family	86	56	001	80	01
Sex	124	69	05	89	ns

P values indicate the statistical significance of the differences between the percentages of individual items of prediction and performance and the percentages of their respective total groups.

*Community* Delinquency, overt crimes, or troublemaking, short of criminal behavior (alcoholism, public brawling, et cetera)

*Work* Inability to maintain steady employment (floating from job to job), inadequacy, or continued difficulties with employers or employees

*Social and recreational activities* Seclusive, overly aggressive, or hostile behavior or absence of recreational life

*School* Consistent pattern of failure, repeated truancy, or serious disciplinary difficulties

*Parental family* Repeated running away from home, incessant quarrels with parents, or excessive dependency upon family

*Sex* Repressed sexual drive (manifested by lack of sexual activity and overly moral attitudes), excessive preoccupation with sex, or persistent overt homosexual drives

It is evident from table 21 that, as usual, psychiatric prediction was strongly influenced by disturbances in pre

All unfavorable criteria were significantly related to rather sharp decreases in predictions of satisfactory service. Except in the sphere of sexual adjustment this judgment was confirmed at least statistically by performance rating. Here the obvious error in psychiatric prediction was not one of direction or quality but rather of degree or quantity. For example only 28 per cent of subjects with a history of questionable or impaired community adjustment were estimated to give satisfactory duty. However 67 per cent rendered adequate service. Also only 32 per cent of subjects with poor work records were considered to be potentially effective soldiers yet 77 per cent functioned satisfactorily. Similarly other categories of questionable and impaired adjustment were strongly related to unfavorable predictions but only mildly influenced performance.

This error of the psychiatrists does not disprove common sense reasoning or personality theory. Rather it highlights the unique difficulties inherent in any effort to predict the later behavior of youthful subjects. The individuals in this study whose ages ranged from 19 to 21 years had not as yet established firm patterns of adjustment but were in a formative and malleable stage and subject to change by external events and internal pressure. This transitional state was particularly evident in the sphere of sexual adjustment in which the group scored as maladjusted nevertheless rendered an average proportion of satisfactory duty. Obviously it is difficult if not impossible to estimate sexual normality in individuals in late adolescence and early adulthood.

**Psychopathology** The psychiatrists were asked to record their over all clinical impression of each subject based upon background data and interview evaluation. Table 22 illustrates the apparent effect of clinical impression upon prediction and the relationship of such diagnostic categories to performance. As expected the psychiatrists were markedly influenced by their own estimate of psychopathology to give unfavorable predictions. But performance ratings demonstrate that clinical impression was of relatively little value in identifying the unsatisfactory soldier. The results in table 22 indicate that in psychiatric prediction one should pay little attention to a clinical impression of a potential neurosis or behavior disorder represented by such diagnoses as neurotic personality, suggestive neurosis, or pathologic personality. On the other hand the presence of overt mental disease at the time of evaluation is correlated with future unsatisfactory duty particularly if the mental illness is of psychotic proportions.

**Intelligence** Intellectual ability is another commonly used index of potential capability and numerous intelligence test batteries have been devised for this purpose. The psychiatrists of

TABLE 22 *Relationship of psychopathology to prediction and performance*

Category	Totals	Satisfactory duty			
		Predicted		Performed	
		Per cent	P value	Per cent	P value
Entire group	505	76		89	
Well integrated	273	94	001	93	01
Neurotic personality	131	73	3	89	ns
Suggestive neurosis	38	31	001	84	7
Pathologic personality	38	48	001	82	3
Overt neurosis	22	14	001	68	05
Latent or overt psychosis	3	0	001	0	001

\*P values indicate the statistical significance of the differences between the percentages of individual items of prediction and performance and the percentages of their respective total groups

this study were also requested to record their estimation of each subject's intelligence from clinical observations made during the examination. Table 23 shows the relationship of these intelligence evaluations to the predictions that were made and to performance ratings. It should be noted that in the previously published reports of this study, the psychiatrists' clinical ratings of intelligence were highly correlated with other measures of intellectual ability such as educational attainment and the Armed Forces Qualification Test (AFQT).

TABLE 23 *Relationship of intelligence to prediction and performance*

Category	Totals	Satisfactory duty			
		Predicted		Performed	
		Per cent	P value	Per cent	P value
Entire group	505	76		89	
Intelligence estimate					
Superior	38	97	01	95	2
Average or above	360	85	001	91	1
Below average	97	43	001	79	02
Deficient	10	0	001	70	8

P values indicate the statistical significance of the differences between the percentages of individual items of prediction and performance and the percentages of their respective total groups



The results in table 23 demonstrate a striking and significant relationship between intelligence as perceived by the psychiatrist and his prediction of later performance. Only one subject judged to be of superior intelligence was predicted to be unsatisfactory. This expectation was largely confirmed by subsequent performance. There were no predictions of satisfactory performance for the 10 subjects considered mentally deficient however 7 rendered satisfactory duty. Similarly in the below average intelligence category, only 43 per cent were considered as potentially satisfactory, yet 79 per cent functioned efficiently. This error of psychiatric prediction is again demonstrated to be due to an overemphasis on unfavorable findings as deleterious to successful military service. More specifically, the results indicate that limited intellectual ability does not necessarily imply potentially unsatisfactory duty, although average or superior intelligence is a good indication of future military effectiveness.

**Interview Behavior** Another element of the examination data which seemed to have strongly influenced the psychiatrists in assessing potential effectiveness was the interview behavior of subjects as reported in the narrative summary. Included in many of the summaries were statements by the psychiatrist relative to the impression made by the subject. Not all of the psychiatrists recorded impressions of the men they examined. Two of the psychiatrists almost never did but in 244 subjects there were sufficient data to classify interview behavior. The following assumption was tested, namely, that the psychiatrists' impressions of interview behavior during the examination strongly influenced their prediction of future military performance. Statements recorded by the psychiatrists relative to interview behavior were independently classified by two of the raters (FJR and AJG) as (1) favorable (2) mixed or (3) unfavorable. The objective validity of the rating scale seemed justified in that better than 90 per cent agreement of the ratings was found. In the few cases of disagreement a mutual decision was achieved by re-examining the record.

A typical favorable impression was as follows:  
The subject is an alert, co-operative white male who volunteered information spontaneously. He accepted the explanation for the interview situation readily and was at ease throughout the interview. He appeared of average intelligence and his veracity was high.

A mixed impression was scored in cases where the psychiatrist recorded both favorable and unfavorable qualities as follows:

The man was co-operative and alert. He volunteered little information spontaneously but answered questions readily. When talking about his parents he cried freely without any attempt at control. There was some evidence of tenseness at the beginning of the interview.

An unfavorable rating was given if the psychiatrist's impression was entirely negative, as follows:

Patient appears impulsive somewhat erratic given to fluctuating emotional attitudes. Seems to have a character and behavior disorder.

The relationship of interview behavior as rated by the above method to prediction and performance is given in table 24. The results indicate that whenever psychiatrists were favorably impressed by interview behavior to the extent of making positive statements to this effect in written summaries, successful duty performance was almost invariably predicted. A favorable interview impression apparently influenced prediction for satisfactory service more than any other component of the psychiatric examination. That such a viewpoint or orientation was valid or correct is supported by ratings of subsequent performance.

TABLE 24 *Relationship of interview behavior to prediction and performance*

Interview behavior	Number	Satisfactory duty	
		Predicted (per cent)	Performed (per cent)
Favorable	117	97	97
Mixed	80	76	91
Unfavorable	47	17	75

The potent effect of interview behavior upon prediction is further supported by the finding that when psychiatrists received an unfavorable impression of the subject, they usually predicted substandard performance (17 per cent). The negative influence of this factor on prediction was only exceeded by that of a diagnosis of overt neurosis or psychosis (14 and 0 per cent) (table 22) or of mental deficiency (0 per cent) (table 23). But unfavorable interview behavior did not correlate with subsequent performance for, as shown in table 24, 75 per cent in this category rendered satisfactory duty. As stated in previous reports of this study, satisfactory predictions based upon favorable criteria are usually valid, but unfavorable findings are not necessarily related to poor duty performance. In other words, identifying the potentially

unsatisfactory soldier is a far more difficult task than identifying the successful soldier

**Differences Among Psychiatrists** Thus far psychiatric predictions have been regarded as originating from a single source. However there were six separate sources in the form of six psychiatrists each of whom made judgments that were undoubtedly influenced by past training, previous clinical experience, and personal bias. In order to investigate the extent of error due to variability of psychiatric opinion, the proportion of success and failure that was predicted by each psychiatrist was determined (fig. 3). It is apparent that there were several quite different patterns of psychiatric prediction. For example, the psychiatrist

### PERFORMANCE PREDICTIONS BY INDIVIDUAL PSYCHIATRISTS

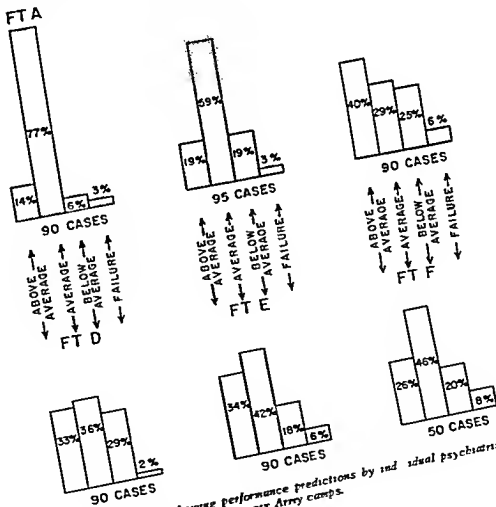


Figure 3. Graphs showing performance predictions by individual psychiatrists in six Army camps.

at Fort A perceived most subjects as average. Not so the psychiatrist at Fort C, who found more superior than average subjects and predicted that a large number (31 per cent) would be below average or poor soldiers. The psychiatrist at Fort D forecast almost no failures but divided his predictions almost equally among the superior, average, and below average categories.

It may be argued that the above variability in psychiatric predictions represented a different distribution of personality types in the six examined groups rather than differences derived from the psychiatrists. But figure 4 demonstrates that the performance of the various groups was relatively similar with only minor variations. Therefore, it follows that in psychiatric prediction there is included an ill defined component of personal bias.

### ACTUAL PERFORMANCE BY CAMP

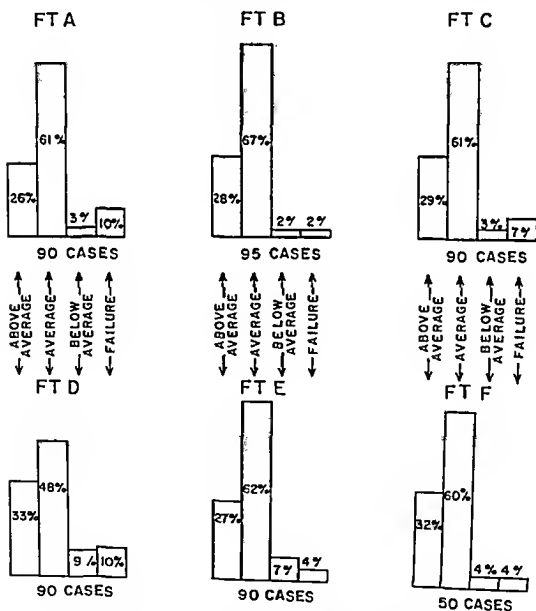


Figure 4 Graphs showing actual performance in six Army camps

that varies in quantity and quality from one psychiatrist to another. This lack of uniformity in prediction among even experienced military psychiatrists is a serious and important obstacle to efficient psychiatric screening. How much more unlikely could a reasonable uniformity of judgment be attained by hundreds of psychiatrists with varying backgrounds of training and experience who would be called upon to perform a similar function at induction stations or training centers in time of full mobilization.

#### SUMMARY

Using 505 basic trainees as a sample this study has explored the relationship between certain factors (early environment, pre service adjustment, psychopathology, intelligence, and interview behavior) and the psychiatrists' prediction of military performance as compared with subsequent actual performance. Also investigated was the uniformity of psychiatric prediction as accomplished by six different psychiatrists. The objective of the study was to determine what influenced the psychiatrists in arriving at their estimations of future military usefulness in recent inductees. If it were possible to better understand the elements of the psychiatric examination that motivated the judgment of the psychiatrists, it might be feasible to demonstrate which of these influences had validity in the light of subsequent performance and which criteria should be disregarded.

It is believed that the results obtained from the study justify the following conclusions:

The examining psychiatrists in arriving at predictions of performance for inductees did not place major emphasis on unfavorable items of the family history and early environment. Although this finding was contrary to expectation, the study indicates psychiatrists were justified in their action. Background data such as emotional disturbances of family members, broken home, and a difficult relationship with the family were only mildly related to levels of performance.

Psychiatrists tended to rely more heavily on data of past performance, such as preservice adjustment to school work and the community. The psychiatrists were partially correct in that previous adjustment was more significantly related to success or failure in the Army than family background categories of information. Here the error of the psychiatrist was one of degree because a majority of subjects with a history of faulty preservice adjustment nevertheless did render satisfactory service.

Psychiatrists were strongly motivated by their own diagnoses of psychopathology or intellectual deficiency to predict unsatisfactory

factory performance. Results of this study indicate that one should pay little attention to potential neuroses or behavior disorders in psychiatric prediction. But the presence of overt neurosis or psychosis does correlate highly with future unsatisfactory duty. Similarly, limited intellectual capacity does not preclude satisfactory military service.

Psychiatrists were markedly influenced by the interview behavior and appearance of subjects. In practically all cases in which a favorable interview impression was recorded, successful performance was predicted, often in spite of unfavorable background information. This finding suggests that the psychiatrists in this study fell back on intuitive judgments and reacted more to the external appearance of subjects and behavior exhibited during the interview than to the content of the interview itself. It was found that a favorable impression was substantiated by later effective performance. However, unfavorable impressions were not equated with unsatisfactory service.

In essence, this study indicates that the psychiatrist can safely proceed upon his favorable impression of a subject but must be wary of predicting failure for a subject who exhibits unfavorable qualities. It also clearly demonstrates that there were important individual differences among psychiatrists in arriving at predictions of later performance. The six psychiatrists of this study were required to use a specifically defined examination procedure designed to produce a relatively uniform body of information from all subjects. Also, the actual performance of the rated groups was comparable. Yet, psychiatrists' predictions for those groups differed significantly, and these differences must be attributed to variations among psychiatrists in matters of personality, training, and experience.

#### REFERENCES

- 17 Glass A J Ryan F J Lubin A Ramana C V and Tucker A C Psychiatric prediction and military effectiveness part 1 *U S Armed Forces M J* 7 1427 1443 Oct 1956
- 18 Glass A J Ryan F J Lubin A Ramana C V and Tucker A C Psychiatric prediction and military effectiveness part 2 *U S Armed Forces M J* 7 1575 1588 Nov 1956

# USE OF X RAYS AND OTHER IONIZING RADIATION

The Responsibilities of the Medical Profession

## UNITED NATIONS SCIENTIFIC COMMITTEE ON EFFECTS OF ATOMIC RADIATION

**P**UBLIC health problems created by the development of atomic energy caused the United Nations General Assembly to establish a Scientific Committee on the Effects of Atomic Radiation. One of the most urgent tasks of this Committee is to collect as much information as possible on the amount of radiation to which man is exposed today and on its effects. Because a substantial proportion of the total radiation received is due to diagnostic radiology and radiotherapy, the Committee considers it desirable to draw attention to information that has been obtained on this subject.

Modern medicine has contributed to the control of many diseases and has substantially prolonged the span of human life. These results have depended in part on the use of radiation in the detection, diagnosis and treatment of disease. It is desirable, however, to review objectively the possible present or future consequences of increased irradiation of populations which result from these medical applications.

It is now accepted that the irradiation of human beings and particularly of their germinal tissues has certain undesirable effects. While many of the somatic effects of radiation may be reversible, germinal irradiation normally has an irreversible and therefore cumulative effect. Any irradiation of the germinal tissues, however slight, thus involves genetic damage which may be small but is nevertheless real. For somatic effects there may be thresholds for any irreversible effects although if so these thresholds may well be low.

The radiation due to natural sources has been estimated to cause between 70 and 170 millirem (milli roentgen equivalent man) of irradiation to the gonads per annum in most parts of countries in which it has been studied although higher values are found locally in some areas. In addition the human race is

subjected to artificial radiation due to medical applications, to atomic industry and its effluents, and to the radioactive fallout from nuclear explosions.<sup>1</sup> The Committee is aware of the potential hazards that such radiation involves, and is collecting and examining information on these subjects. The amount of radiation received by the population for medical purposes is now, in certain countries, the main source of artificial radiation, and in Sweden and the United States is probably about equal to that from all natural sources. Moreover, since it is given on medical advice, the medical profession exercises responsibility in its use.

The Committee appreciates the importance and value of the correct medical use of radiation, both in the diagnosis of a large number of conditions and in the treatment of many such diseases as cancer, in the early mass detection of conditions such as pulmonary tuberculosis, and in the extension of medical knowledge. Moreover, it appreciates fully the contribution of the radiological profession, through the International Commission on Radiological Protection,<sup>2</sup> in recommending maximum permissible levels of irradiation. As regards those whose occupation exposes them to radiation, the establishment of these levels depends on the view that there are doses which, according to present knowledge, do not cause any appreciable body injury in the irradiated individual, and also on the consideration that the number of people concerned is sufficiently small for the genetic repercussions upon the population as a whole to be slight. Whenever exposure of the whole population is involved, however, it is considered prudent to limit the dose of radiation received by germinal tissue from all artificial sources to an amount of the order of that received from the natural background radiation.

*It appears most important, therefore, that medical irradiations of any form should be restricted to those which are of value and importance, either in investigation or in treatment, so that the irradiation of the population may be minimized without any impairment of the efficient medical use of radiation.* The Committee is consequently anxious to receive information through appropriate governmental channels as to the methods and the extent by which such economy in the medical use of radiation can be achieved, both by avoiding examinations which are not clearly indicated and by decreasing the exposure to radiation during examinations, particularly if the gonads, or the fetus during pregnancy, lie in the direct beam of radiation. It seeks, in particular, to obtain information as to the reduction in radiation of the population that might be achieved by improvements in instrument design, by fuller training of personnel, by local shield



# USE OF X RAYS AND OTHER IONIZING RADIATION

## The Responsibilities of the Medical Profession

### UNITED NATIONS SCIENTIFIC COMMITTEE ON EFFECTS OF ATOMIC RADIATION

**P**UBLIC health problems created by the development of atomic energy caused the United Nations General Assembly to establish a Scientific Committee on the Effects of Atomic Radiation. One of the most urgent tasks of this Committee is to collect as much information as possible on the amount of radiation to which man is exposed today and on its effects. Because a substantial proportion of the total radiation received is due to diagnostic radiology and radiotherapy the Committee considers it desirable to draw attention to information that has been obtained on this subject.

Modern medicine has contributed to the control of many diseases and has substantially prolonged the span of human life. Those results have depended in part on the use of radiation in the detection, diagnosis and treatment of disease. It is desirable however to review objectively the possible present or future consequences of increased irradiation of populations which result from these medical applications.

It is now accepted that the irradiation of human beings and particularly of their germinal tissues has certain undesirable effects. While many of the somatic effects of radiation may be reversible, germinal irradiation normally has an irreversible and therefore cumulative effect. Any irradiation of the germinal tissues, however slight, thus involves genetic damage which may be small but is nevertheless real. For somatic effects there may be thresholds for any irreversible effects although if so these thresholds may well be low.

The radiation due to natural sources has been estimated to cause between 70 and 170 millirem (milli-roentgen equivalent man) of irradiation to the gonads per annum in most parts of countries in which it has been studied although higher values are found locally in some areas. In addition the human race is

# TREATMENT OF PARAPHIMOSIS

RICHARD W. CLIFTSOWAY *Captain, MC USA*

EVAN L. LEWIS *Lieutenant Colonel MC USA*

**P**ARAPHIMOSIS is the condition where a tight or inflamed foreskin is caught proximal to the glans penis and the patient cannot replace the foreskin in its normal position. This tight foreskin occludes circulation and causes swelling of the subcutaneous tissues between the glans and the constricting band. If this condition is prolonged, there may be tremendous swelling, gangrene of the constricting band, and eventually gangrene of the entire penis distal to the band. The treatment of paraphimosis outlined in the standard books of urology<sup>1-4</sup> are (1) hot applications and cleansing of the lesion, (2) manual reduction of the foreskin and, in case this is unsuccessful, (3) dorsal slit followed by circumcision after the dorsal slit heals and the inflammation and swelling subside. The first method is to be condemned for delaying definitive therapy. The second method should be tried and will be successful in the majority of early cases. It is the third method, dorsal slit, that we intend to discuss.

This method seems to involve an unduly long morbidity. Dorsal slit relieves the circulatory embarrassment caused by the constricting band, but the edema subsides only slowly. The method also leaves a wound, which theoretically should be allowed to heal prior to definitive therapy by circumcision. Ideally, the edema subsides, the wound heals, and the inflammation disappears so that circumcision can be performed in from 2 to 3 weeks. Circumcision produces another 7 to 10 day morbidity. By morbidity is meant not necessarily hospital time, but a period of incapacity due to pain and swelling. This unsatisfactory total morbidity of from 3 to 4 weeks is frequently markedly prolonged when the dorsal slit, which is made across edematous, anoxic tissue, becomes infected.

## CASE REPORT

A 21 year old corporal was transferred from a nearby dispensary to this hospital on 14 October 1953 with a marked paraphimosis and necrosis of the dorsal portion of the constricting band. This condition had been treated as balanitis for five days with antibiotics and soaks. Immediately on arrival the patient was taken to surgery where a dorsal

---

From Tokyo Army Hospital APO 500 San Francisco Calif. Dr Cliftsoway is now at 1235 Morro Street San Luis Obispo Calif.

slit was done. It was not until 27 October 13 days later that he was ready for circumcision. He was released 31 October. Total morbidity—22 days.

We could not see why immediate circumcision could not be done in those cases where dorsal slit had been indicated. This would eliminate the dorsal slit operation. Anesthesia would be required once rather than twice and the morbidity would be decreased by that long period between dorsal slit and circumcision. There seemed to be no greater possibility of infection of the circumcision wound than of the dorsal slit wound and with the use of prophylactic antibiotics the procedure seemed even more feasible. In reviewing the literature the only pertinent reference found was a description of immediate circumcision in 42 cases of infected phimosis. The author cited a marked improvement in results with "healing per primam" 9 cases, healing satisfactory 18 cases, some infection along suture line 11 cases, healing slow 4 cases. At the time antimicrobial therapy was limited to sulfanilamide, sulfapyridine and sulfathiazole given in very limited amounts.

Our method is to operate as soon as possible after the patient is first seen. The anesthetics used are Pentothal Sodium (brand of thiopental sodium) injected intravenously and nitrous oxide and oxygen by mask. Circumcision is done by the dorsal slit technique removing all the edematous foreskin in ulcerated area and grossly inflamed skin down to fairly normal skin on the penile shaft. Although the mucous membrane reflected from the glans is edematous and somewhat friable no difficulty has been encountered in the suturing when a No. 0 plain catgut continuous suture is used. A petrolatum impregnated gauze dressing is applied. This is removed completely on the second postoperative day. Five hundred milligrams of Terramycin (brand of oxytetracycline) is given four times daily for five days.

Since August 1953, we have performed immediate circumcision on 13 patients with paraphimosis for whom dorsal slit would usually be indicated. Elevation of this number showed ulceration and gangrene at the site of the constricting band. All incisions healed by primary intention and no patient had a morbidity or hospital stay longer than for the average circumcision. If anything the wounds healed faster and looked better than those of some patients who had had routine circumcisions without receiving antibiotics.

#### CASE REPORT

A 25 year-old corporal was transferred to this hospital on 15 September 1953 from a nearby United Nations dispensary. He had a history of "balanitis" for 5 days for which he had been treated with antibiotics and soaks with a gradual increase in swelling and pain (fig. 1). He

was found to have a marked paraphimosis with ulceration of the constricting band on the dorsum of the penis. The paraphimosis could not be manually reduced without severe pain. The patient was taken immediately to surgery where circumcision was done as previously described (fig 2). The patient made an uneven recovery and was returned to the referring unit on the fourth postoperative day (fig 3).



*Figure 1 Phimosis of 5 days duration with ulceration of the constricting band*

Because this method gave such uniformly good results, we recommend its use in all cases of paraphimosis which cannot be easily and painlessly reduced.

#### SUMMARY

Paraphimosis, if not adequately treated soon after it occurs, may produce a prolonged morbidity. In its early stages, it can be successfully treated by manually reducing the foreskin. When it has progressed to marked edema, ulceration or gangrene, and infection, operative intervention is required.

If a dorsal slit of the constricting band is allowed to heal before a circumcision is performed, an inordinately long morbidity may result. Thirteen patients with paraphimosis requiring operative intervention were treated by performing an immediate circumcision. With prophylactic antibiotic therapy the wound healed rapidly and morbidity was markedly reduced.

Immediate circumcision is recommended as a replacement for the dorsal slit procedure in the treatment of paraphimosis when manual reduction of the foreskin is impossible.

slit was done It was not until 27 October 13 days later that he was ready for circumcision He was released 31 October Total morbidity—22 days

We could not see why immediate circumcision could not be done in those cases where dorsal slit had been indicated This would eliminate the dorsal slit operation, anesthesia would be required once rather than twice, and the morbidity would be decreased by that long period between dorsal slit and circumcision There seemed to be no greater possibility of infection of the circumcision wound than of the dorsal slit wound, and with the use of prophylactic antibiotics the procedure seemed even more feasible In reviewing the literature the only pertinent reference found was a description of immediate circumcision in 42 cases of infected phimosis The author cited a marked improvement in results with "Healing per primam 9 cases healing satisfactory 18 cases some infection along suture line 11 cases healing slow 4 cases" At the time antimicrobial therapy was limited to sulfanilamide sulfapyridine and sulfathiazole given in very limited amounts

Our method is to operate as soon as possible after the patient is first seen The anesthetics used are Pentothal Sodium (brand of thiopental sodium) injected intravenously and nitrous oxide and oxygen by mask Circumcision is done by the dorsal slit technic removing all the edematous foreskin in ulcerated area and grossly inflamed skin down to fairly normal skin on the penile shaft Although the mucous membrane reflected from the glans is edematous and somewhat friable no difficulty has been encountered in the suturing when a No 0 plain catgut continuous suture is used A petrolatum impregnated gauze dressing is applied this is removed completely on the second postoperative day Five hundred milligrams of Terramycin (brand of oxytetracycline) is given four times daily for five days

Since August 1953 we have performed immediate circumcision on 13 patients with paraphimosis for whom dorsal slit would usually be indicated Eleven of this number showed ulceration and gangrene at the site of the constricting band All incisions healed by primary intention and no patient had a morbidity or hospital stay longer than for the average circumcision If anything the wounds healed faster and looked better than those of some patients who had had routine circumcisions without receiving antibiotics

#### CASE REPORT

A 25 year-old corporal was transferred to this hospital on 15 September 1953 from a nearby United Nations dispensary He had a history of "balanitis" for 5 days for which he had been treated with antibiotics and soaks with a gradual increase in swelling and pain (fig 1) He

was found to have a marked paraphimosis with ulceration of the constricting band on the dorsum of the penis. The paraphimosis could not be manually reduced without severe pain. The patient was taken immediately to surgery where circumcision was done as previously described (fig 2). The patient made an uneventful recovery and was returned to the referring unit on the fourth postoperative day (fig 3).



Figure 1 Phimosis of 5 days duration with ulceration of the constricting band.

Because this method gave such uniformly good results, we recommend its use in all cases of paraphimosis which cannot be easily and painlessly reduced.

#### SUMMARY

Paraphimosis, if not adequately treated soon after it occurs, may produce a prolonged morbidity. In its early stages, it can be successfully treated by manually reducing the foreskin. When it has progressed to marked edema, ulceration or gangrene, and infection, operative intervention is required.

If a dorsal slit of the constricting band is allowed to heal before a circumcision is performed, an inordinately long morbidity may result. Thirteen patients with paraphimosis requiring operative intervention were treated by performing an immediate ~~circum-~~circumcision. With prophylactic antibiotic therapy the wound ~~healed~~ healed rapidly and morbidity was markedly reduced.

Immediate circumcision is recommended as a replacement for the dorsal slit procedure in the treatment of paraphimosis when manual reduction of the foreskin is impossible.

## U S ARMED FORCES MEDICAL JOURNAL

slit was done It was not until 27 October 13 days later that he was ready for circumcision He was released 31 October Total morbidity—22 days

We could not see why immediate circumcision could not be done in those cases where dorsal slit had been indicated This would eliminate the dorsal slit operation anesthesia would be required once rather than twice and the morbidity would be decreased by that long period between dorsal slit and circumcision There seemed to be no greater possibility of infection of the circumcision wound than of the dorsal slit wound and with the use of prophylactic antibiotics the procedure seemed even more feasible In reviewing the literature the only pertinent reference found was a description of immediate circumcision in 42 cases of infected phimosis The author cited a marked improvement in results with "healing per primam 9 cases healing satisfactory 18 cases, some infection along suture line 11 cases healing slow 4 cases" At the time antimicrobial therapy was limited to sulfanilamide sulfapyridine and sulfathiazole given in very limited amounts

Our method is to operate as soon as possible after the patient is first seen The anesthetics used are Pentothal Sodium (brand of thiopental sodium) injected intravenously and nitrous oxide and oxygen by mask Circumcision is done by the dorsal slit technique removing all the edematous foreskin ulcerated area and grossly inflamed skin down to fairly normal skin on the penile shaft Although the mucous membrane reflected from the glans is edematous and somewhat friable no difficulty has been encountered in the suturing when a No 0 plain catgut continuous suture is used A petrolatum impregnated gauze dressing is applied this is removed completely on the second postoperative day Five hundred milligrams of Terramycin (brand of oxytetracycline) is given four times daily for five days

Since August 1953 we have performed immediate circumcision on 13 patients with paraphimosis for whom dorsal slit would usually be indicated Eleven of this number showed ulceration and gangrene at the site of the constricting band All incisions healed by primary intention and no patient had a morbidity or hospital stay longer than for the average circumcision If anything the wounds healed faster and looked better than those of some patients who had had routine circumcisions without receiving antibiotics

## CASE REPORT

A 25 year old corporal was transferred to this hospital on 15 September 1953 from a nearby United Nations dispensary He had a history of "balanitis" for 5 days for which he had been treated with antibiotics, soaks with a gradual increase in swelling and pain (fig 1) He

was found to have a marked paraphimosis with ulceration of the constricting band on the dorsum of the penis. The paraphimosis could not be manually reduced without severe pain. The patient was taken immediately to surgery where circumcision was done as previously described (fig 2). The patient made an uneventful recovery and was returned to the referring unit on the fourth postoperative day (fig 3).



Figure 1 Phimosis of 5 days' duration with ulceration of the constricting band.

Because this method gave such uniformly good results, we recommend its use in all cases of paraphimosis which cannot be easily and painlessly reduced.

#### SUMMARY

Paraphimosis, if not adequately treated soon after it occurs, may produce a prolonged morbidity. In its early stages, it can be successfully treated by manually reducing the foreskin. When it has progressed to marked edema, ulceration or gangrene, and infection, operative intervention is required.

If a dorsal slit of the constricting band is allowed to heal before a circumcision is performed, an inordinately long morbidity may result. Thirteen patients with paraphimosis requiring operative intervention were treated by performing an immediate circumcision. With prophylactic antibiotic therapy the wound healed rapidly and morbidity was markedly reduced.

Immediate circumcision is recommended as a replacement for the dorsal slit procedure in the treatment of paraphimosis, when manual reduction of the foreskin is impossible.





Figure 2 Immediate postoperative appearance Figure 3 Appearance on the fourth postoperative day There is no evidence of inflammation.

## REFERENCES

- 1 Campbell M Clinical Pediatrics W B Saunders Co Philad lph P 1951 pp 957-959
- 2 McCrea L E Clinical Urology 2d edition F A Davis Co Phil d lph P 1948 pp 99-100
- 3 R. Inack H C The Practice of Urology J B Lippincott C Phil d lph P 1949 Vol 1 pp 198-199
- 4 W. A. Bury-Whit H P (ed to) Textbook of Genito-Urinary Surgery W B Saunders Co Phil d lph P 1948 pp 603-604
- 5 T. J. H. B. Imm d te c cum t n f s infected ph mos s i p t f 42 c ses 195-619 Dec 1944

# CHLORPROMAZINE JAUNDICE

ROBERTO F. BENITEZ, *Lieutenant Colonel MC, USA*

THEODORE A. MERSCH, *Lieutenant Colonel MC, USA*

JOSEPH CASTAGNO, *Lieutenant Colonel MC, USA*

EDWIN M. GOYETTE, *Colonel MC, USA*

**C**HLORPROMAZINE, one of the recently discovered tranquilizing drugs, is in widespread use, especially for psychiatric patients. It has been used in Europe since 1951 and in America since 1954. The evidence gathered to date seems to indicate that these drugs will prove most useful in those patients for whom barbiturates were found to be effective in the past, and especially in outpatients.

An obstructive type of jaundice caused by this drug has been reported with increasing frequency in the recent literature. Clinically, it is important to distinguish this type of jaundice from others of obstructive type, as the condition may be erroneously attributed to some cause amenable to surgery and an unnecessary operation performed. In the following case the diagnosis was made clinically and confirmed by liver biopsy.

## CASE REPORT

A 28 year old white enlisted man with 10 years' service was hospitalized from 22 October to 2 November 1955 for depressive symptoms after two months in Germany. The history as obtained from his wife indicated that he "acted childlike just as a small boy would act." He had financial difficulties with his mother who demanded support from him. The patient was discharged on 2 November on a social service follow-up basis and on this day he was started on 25 mg of Thorazine (brand of chlorpromazine) three times per day. Depression recurred with anxiety and lack of confidence and he complained about failing his wife and children, inadequacy and an inability to "face things." On 17 November he took 3 Thorazine tablets, 1 aspirin and 2 teaspoons of elixir of phenobarbital sodium. He told his wife who took him to the dispensary. Because of language difficulty (the wife is Japanese), the German doctor sent the patient to a hospital as an attempted suicide.

Physical and neurologic examination was essentially negative. The patient appeared depressed, looked away and was passively uncooperative. He talked little and sighed often. His thoughts were poorly

---

From U. S. Army Hospital, Frankfurt APO 757 New York N. Y.

organized but not dissociated. There were no delusions or hallucinations and affect was generally appropriate.

Laboratory studies on 18 November showed a hemoglobin of 14.8 g/100 ml and a white blood cell count of 6500/ $\mu$ l with 59 per cent neutrophils, 25 per cent lymphocytes, 15 per cent eosinophils and 1 per cent basophils. The serologic test for syphilis was negative and the heterophile antibody titer was normal. Total cholesterol was 350 mg/100 ml esters 68 per cent of total. Liver function tests are shown in table 1. On 16 December the prothrombin time was 90 per cent of normal and on 6 January 1956 a roentgenogram of the abdomen was negative.

On 25 January hematocrit was 46 ml/100 ml, hemoglobin 15.8 g/100 ml, red blood cell count 6 040 000/ $\mu$ l and white blood cell count 5200/ $\mu$ l with 55 per cent neutrophils, 41 per cent lymphocytes, 2 per cent monocytes and 2 per cent eosinophils. Bleeding time was 2 $\frac{1}{2}$  minutes, coagulation time 12 $\frac{1}{2}$  minutes and sedimentation rate 25.

The patient was placed on a closed ward and given a regular diet and 0.2 gram of Amytal Sodium (brand of amobarbital sodium) before bedtime. The day after admission he noticed severe generalized itching and the following day his stools were light colored. His appetite was poor the first week and he was depressed and unsociable. He lost some weight after admission and appeared lethargic and disinterested. On 28 November he was placed on 0.75 mg of Serpasil (brand of reserpine) twice a day and moved to an open ward.

On 5 December scleral icterus was first noticed. The patient then stated that his urine had been dark since 10 November. Examination on 5 December revealed moderate icterus of the sclerae and skin, multiple excoriations of the skin due to scratching, and non-tender enlargement of the liver two fingerbreadths below the right costal margin. All medication was stopped and he was placed on modified bed rest on a high protein, high-carbohydrate, low-fat diet supplemented with hexavitamins. On 14 and 15 December he had diarrhea, five to six stools each day. There was little change in icterus and itching during the following six weeks and on 26 January biopsy of a specimen of the liver was performed.

The gross specimen was a threadlike fragment of mottled greenish-tan tissue approximately 3.5 cm in length. Microscopic examination revealed liver tissue in which the architecture was essentially unchanged. There was marked plugging of the hilar canaliculi by green bile thrombi, usually in the central portion of the lobules (fig. 1) and bile pigment in Kupfer's cells. The portal areas were not unusual. A few showed a sparse sprinkling with mononuclear cells. The bile ducts showed no dilatation or plugging. Within the lobules some individual cells showed degenerative changes with an orange or hyaline-like cytoplasm and pyknotic nuclei. In areas there was a slight variation in the

TABLE 1 Summary of liver function tests in patient with chlorpromazine jaundice

	6 Dec	8 Dec	16 Dec	23 Dec	30 Dec	7 Jan	10 Jan	17 Jan	23 Jan
Serum bilirubin (mg/100 ml)									
Direct	2.49	2.15	2.15	2.30	2.49		1.84	2.03	2.42
Indirect	2.65	2.99	2.15	2.50	3.19		2.76	2.11	2.72
Total	5.14	5.14	4.30	4.80	5.68		4.60	4.14	5.14
Cephalin-cholesterol flocculation (units)									
24 hours		0	+	tr	2+	2+	tr	neg	
48 hours		0	+	tr	3+	3+	tr	tr	
Thymol turbidity (units)	2.6	2.4	8.0	2.6	2.0		2.0	2.8	2.0
Urine									
Bile	+	+	+	+	tr		0	+	tr
Urobilinogen	0	0	0	0	0		1.2	0	0
Serum alkaline phosphatase (Hofmann units)		12.7	14.1	16.8	12.74		15.1		16.4
Serum protein (g/100 ml)									
Albumin		4.05							
Globulin		3.25							
Total		7.30							

size and shape of the cells and nuclei. Bizarre multiple nuclei could be found in some cells (fig 2). A few usually single eosinophils could be seen.

These changes were interpreted as intrahepatic bile stasis compatible with so-called "chlorpromazine jaundice." The degenerative and regenerative changes suggested some degree of liver damage. However it could not be determined histologically whether this occurred before or after Thorazine therapy.

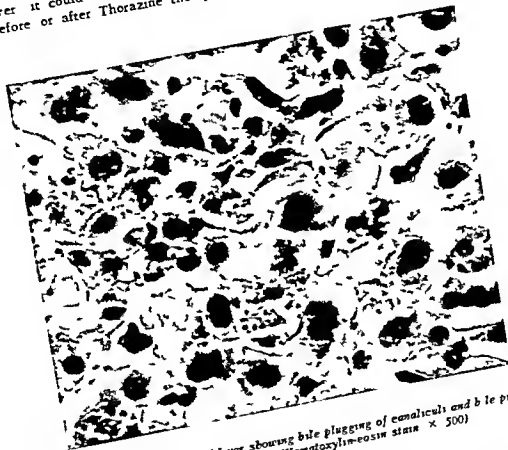


Figure 1 Central area of liver showing bile plugging of canaliculi and bile pigment in Kupfer's cells. (Hematoxylin-eosin stain  $\times 500$ )

Further questioning of the patient failed to elicit any history of previous hepatitis or liver disease. When evacuated to the zone of the interior three months after onset he was still jaundiced. The pruritus had diminished slightly in intensity since admission. The total serum bilirubin was still elevated. The only follow up we have in this case is a letter from the patient dated six weeks after evacuation in which he indicated he was feeling well. The jaundice was "almost clear" and the laboratory tests "almost normal."

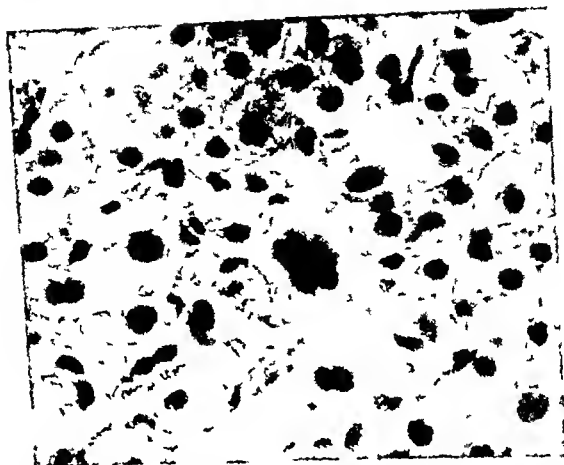


Figure 2 Section of liver showing slight cellular edema, nuclear pleomorphism, hyperchromatism, and a multinucleated cell in the center of the field. (Hematoxylin-eosin stain  $\times 500$ )

### DISCUSSION

The general consensus of opinion is that jaundice constitutes an infrequent complication of chlorpromazine therapy. Various reports show an incidence varying from 1 to 5 per cent.<sup>1-3</sup> Zitt<sup>4</sup> stated that Megaphen (brand of chlorpromazine) has been used at the Frankfurt University Nervenklinik in about a thousand cases without a single case of jaundice occurring. Generally, European authors report a lower percentage of jaundice as a complication of chlorpromazine therapy. This aroused our curiosity and led us to believe that possibly there were some differences between various brands of chlorpromazine. However, on inquiring locally, we found that Megaphen, Largactil, and Thorazine are in fact all identical. The largest single series of cases in current psychiatric literature reporting complications in chlorpromazine therapy was a recent report by Denber and Bird.<sup>5</sup> In this series of 1,300 cases there were 18 cases (1.3 per cent) of jaundice reported, 8 developed within the first month of treatment with Thorazine, 9 within the second, and 1 in the third. After withdrawal of the drug, 15 of these 18 cases cleared in 7 days. Of the remaining 3 patients, 2 were suspected of having gallbladder disease, cholelithiasis

was found at operation in one of these two The jaundice apparently cleared in the other after 12 weeks

There are other complications in chlorpromazine therapy that occur with greater frequency than jaundice especially when large doses are given over a prolonged period of time In the series mentioned above a Parkinson like syndrome occurred in 85 cases (65 per cent) and a skin rash in 54 cases (4 per cent) Both of those complications also responded either to discontinuation of the drug or to appropriate specific therapy Other possible complications are lowering of blood pressure to dangerous levels and hyperpyrexia

The clinical features of chlorpromazine jaundice are usually as follows

1 It more commonly follows oral rather than parenteral administration Onset usually occurs a week or more after treatment in some cases from one day to two weeks after withdrawal One exception was Sussman and Sumner's<sup>6</sup> case, in which pruritus and jaundice appeared 2 and 12 days respectively, after a single dose of 50 mg of Thorazine

2 Grippelike symptoms with fever may occur

3 Abdominal distress usually without actual pain and change in bowel habits may occur at the onset

4 Occasionally there is nausea and vomiting

5 Jaundice appears several days later frequently accompanied by pruritus, dark urine and clay colored stools

6 The liver may be tender

7 The patient is seldom seriously ill

8 The jaundice lasts about three weeks In some cases it has persisted longer Azima and Ogle<sup>7</sup> reported one case where jaundice was still present seven months after onset

9 Biochemical tests suggest obstructive jaundice

10 Eosinophilia is seen in some cases Hartnett<sup>8</sup> reported one case with 58 per cent eosinophils at one time

11 Biopsy of the liver usually shows centrilobular bile stasis with or without inflammatory reaction Some pathologists<sup>9</sup> use this finding in differentiation from extrahepatic obstruction with the note of caution that this is not foolproof Others like Watson<sup>10</sup> believe that the lesions seen in cholangiolitic hepatitis and jaundice due to arsphenamine methyltestosterone or chlorpromazine are not distinctive

12 There is no residual hepatic damage after recovery. The last statement may be too optimistic. There are reports, such as that of Hartnott's case, in which there was evidence of residual liver damage (excess urobilinogen in the urine) six months after recovery. Some reports<sup>11</sup> point out that jaundice might be precipitated in patients with impaired liver function. It is also of interest that patients with previous liver disease show an increased responsiveness to chlorpromazine.<sup>12</sup>

Several fatal cases have been reported recently. Deschamps<sup>13</sup> case was a seriously ill patient who died on the fourth day of therapy for delirium tremens. However, he had severe cirrhosis of the liver. Boardman<sup>14</sup> described "toxic hepatitis" in his case. However, at the time there were three other cases in the hospital with infectious hepatitis. Tasker<sup>15</sup> reported a death in a patient who first exhibited jaundice and in whom the drug was continued until agranulocytosis developed before death. Hodges<sup>16</sup> patient also developed agranulocytosis before death. It differed in that only one 10 mg dose was given intramuscularly after an exploratory operation for jaundice. The patient had previously received 25 mg of chlorpromazine twice daily for 21 days. Agranulocytosis appeared a few days after operation. Seventeen fatal cases in 45 patients developing blood dyscrasias after the administration of chlorpromazine have been reported.<sup>17</sup>

The liver injury produced by chlorpromazine is similar to that caused by arsphenamine, thiouracil, methyltestosterone, and dinitrophenol. The various theories advanced to explain the changes favor the idea of direct toxic damage to cells. As a result of alterations in the cell membranes there is interference with hydration of the bile. Some authors<sup>18</sup> point to the edema of the central cells to explain the plugging of the canaliculi in this area, while the most peripheral areas are free of changes. This observation may explain why, in cases where a T tube is placed in the common duct, the bile drained is normal in volume and viscosity, since the bile secreted by the peripheral portion of the lobule is excreted without impediment.

There is much speculation as to whether the drug acts as a hepatotoxin or whether it is a matter of drug sensitization. In support of the latter theory is the delay in onset and the occurrence of granulocytopenia, agranulocytosis, and dermatitis in some cases. Dermatitis occurring in 13 of 425 nurses and 1 of 6 pharmacists handling chlorpromazine is reported.<sup>19</sup> Accelerated reactions have been explained on the basis of cross sensitivity, and it is pointed out<sup>4</sup> that chlorpromazine is closely related chemically to some commonly used antihistamines such as phenergan, which is a derivative of phenothiazine. Most authors emphasized that in several cases no jaundice had been observed on a s



trial with the drug. However, Sussman and Sumner's patient was given 38 mg of the drug orally seven months later. No jaundice appeared but the patient had epigastric distress, nausea and vomiting two hours later. The liver function tests were repeated and showed an elevation in the serum bilirubin and alkaline phosphatase.

In the management of this disorder a high caloric diet with added vitamins is recommended. Activity is restricted and the drug discontinued. Steroids are said to be of no value. Hydrocholeretic agents are suggested by some authors. A brief trial of corticotropin (ACTH) was ineffective in this case. The dosage of ACTH given was 25 mg intramuscularly daily for one week. It is realized that this dose was too small to be considered an adequate clinical trial. However, we were wary lest the patient's psychosis be aggravated by the hormone.

To date we have given Thorazine in varying doses to over 100 psychiatric patients. This is our first case of jaundice. Possible complications with any therapy must always be watched for; however, the possibility of this complication as yet does not preclude the further use of chlorpromazine in psychiatric patients.

### SUMMARY

A case of jaundice following administration of chlorpromazine is presented. Some of the clinical and pathologic features of this disease are discussed. The diagnosis can be made with a good history, appropriate liver function tests and biopsy of a specimen of the liver or cholangiography, and an unnecessary operation may be avoided.

### REFERENCES

- McHardy G, McHardy R and Casale S. Chlorpromazine (Thorazine) hepatitis. *Gastroenterology* 29:184-188 Aug 1955.
- Stacey C H, Azuma H, Illustre D W, Howell J G and Hoffman M V. Jaundice occurring during administration of chlorpromazine. *Canad. M. A. J.* 73:386-392 Sept 1 1955.
- Mott E R, Meyer M A, Sullivan A M, Goldman M J, Gibson J R, Sullivan B H, Jr, Webster J G and Sen R B. Jaundice associated with administration of chlorpromazine. *SKF 2601 A (Thorazine) report of the committee on the use of 50 mg of chlorpromazine*. *Gastroenterology* 28:901-913 June 1955.
- Zutter J P. Personal communication.
- Oeber H C B and Bird E G. Chlorpromazine in the treatment of mental illness: side effects and relapses. *Am. J. Psychiatry* 112:465 Dec 1955.
- Sussman R M and Sumner P. Jaundice following administration of 50 mg of chlorpromazine. *New England J. Med.* 253:499-502 Sept 22 1955.
- Azuma H and Ogilvie W. Effect of large titration in mental syndrome. *Canad. M. A. J.* 71:116-121 Aug 1954.
- Hartman B S, Lerner M S and Rosenblyum following chlorpromazine therapy. *Report of cases*. *Brit. M. J.* 1:1458-1459 June 18 1955.
- Caleman B. In discussion. *Cas. r cord of Massachusetts General Hospital*.
- Kelly C. Pathological x-rays. *New England J. Med.* 253:379-383 Sept 1 1955.

- 10 Watson C J In discussion of preceding presentations and general remarks Presented at 11th annual meeting of Association for Study of Liver Diseases Chicago Ill Oct 28 1954 (Research Society Abstracts section) *Am J Med* 19 641 643 Oct 1955
- 11 Winkelman N W Chlorpromazine in treatment of neuropsychiatric disorders *J A M A* 155 18 21 May 1 1954
- 12 Moyer J Li Kent B Knight R Morris G Huggins R and Handley C A Laboratory and clinical observations on chlorpromazine (SALF 2601 A)-hemodynamic and toxicological studies *Am J M Sc* 227 283 290 Mar 1954
- 13 Deschamps A libération artificielle en psychiatrie *Presse med* 60 944-946 June 21 1952 Cited in Loftus L R Hutzenga J A Staudier M Li Rome Li P and Cain J C Jaundice caused by chlorpromazine (thorazine) *J A M A* 157 1286-1288 Apr 9 1955
- 14 Boardman R H Fatal case of toxic hepatitis implicating chlorpromazine *Brit M J* 2 579 Sept 4 1954
- 15 Tasker J R Fatal agranulocytosis during treatment with chlorpromazine *Brit M J* 1 950-951 Apr 16 1955
- 16 Hodges H H and LaZerte G D Jaundice and agranulocytosis with fatality following chlorpromazine therapy *J A M A* 158 114 116 May 14 1955
- 17 Council on Pharmacy and Chemistry Blood dyscrasias associated with chlorpromazine therapy *J A M A* 160 287 Jan 28 1956
- 18 Lindsay S and Skahan R Jaundice during chlorpromazine (thorazine) therapy histologic study of hepatic lesions in five patients *A M A Arch Path* 61 84 90 Jan 1956
- 19 Chlorpromazine dermatitis (Foreign Letters section) *J A M A* 160 74 Jan 7 1956

## TRANQUILIZING DRUGS AND THE COMMUNITY

There are serious social implications we think in the widespread administration of Reserpine Chlorpromazine and the other tranquilizers Relaxation, within limits is all very well but it can be carried to a point at which individuals are removed from participation in society or at least made less aware than they ought to be of their surroundings A community most members of which were rendered wholly free from worry and tension could become a complacent community readily susceptible to the manipulation of a dictator Opium smoking relieves anxiety, too But it removes the smoker from reality People who mean to be self governing need to beware of too much tranquilization "

—EDITORIAL

in *The Washington Post and Times Herald*  
Dec 3 1956

# IMPORTANCE OF FLEXION IN CERVICAL TRACTION FOR RADICULITIS

BENJAMIN L. CRUE, Jr. *Lieutenant Commander MC USN*

**H**ELPING the patient to obtain relief from pain in cervical radiculitis often seems a very difficult task. Cervical traction is one of the main forms of conservative treatment. However, if this traction is used incorrectly, the patient often gains no benefit, but may indeed be made more uncomfortable. In this syndrome the neck should be kept in flexion and not allowed to hyperextend.

The use of traction has long been a standard adjunct in the conservative management of the syndrome of herniations of the nucleus pulposus, both lumbar and cervical, by the orthopedist and the neurosurgeon. The routine use of bilateral leg traction for patients with lumbar disks has gradually been discarded in favor of earlier laminectomy, but the use of cervical traction seems ever to grow in popularity. Every physician has his own preference of helter type, weight, time schedule, length of trial, and concurrent use of physiotherapy, neck brace, or collar.<sup>1</sup> In the majority of conditions for which cervical traction is used almost any type of traction can be expected to give some degree of relief. In the tension syndromes, originally largely psychogenic, and even in the true organic cervical sprains and whiplash injuries, many types of traction will give varying relief. Often a trial and error method must be used. This is not true in cervical disk disease.

The literature contains many articles which discuss in detail cervical fractures or dislocations. There has been much less written concerning the technique of traction in the less acute or less severe conditions. Most head halters for cervical traction are constructed with a strap under the chin and a second strap behind the occiput. The straps may be of equal size, or the occipital strap may be smaller, mainly used to keep the larger strap under the chin from sliding forward. In either case, if traction is applied in a straight line with the long axis of the body most of the force is applied by the strap under the chin. This is especially true when overhead traction is applied with a heavy pull for a short

time, with the patient in a sitting position. This pull under the chin almost invariably lends to a considerable degree of extension of the neck. It should cause little wonder that this type of traction may result in little or no improvement, and may intensify the pain in those patients with true radiculitis resulting from encroachment on the foramina. One of the diagnostic signs of cervical radiculitis is radiating pain on hyperextension of the neck. Extreme flexion of the neck may also cause local pain due to tightness, but usually causes no radicular pain.

In the syndrome of herniated cervical disk there are two distinctly different general groups of cases. The acutely herniated nucleus pulposus, either protruded or extruded, with compression or irritation of a single nerve root, occurs in the cervical as well as in the lumbar area. If there are definite neurological signs of compression, prompt surgery is the treatment of choice for the herniated cervical disk. However, in the early or minimal case, or in the patient for whom surgery is otherwise contraindicated, cervical traction remains a factor in the conservative management.

This still leaves a large second group of patients with the so-called "hard disk" or "spurs" at the foramina. These patients are usually in the older age group. There is usually some degree of associated osteoarthritic change in the cervical spine. Often more than one root level is involved, and often the condition is bilateral. The usual picture is one of chronic recurrent radicular irritation with pain, but with only minimal neurologic evidence of nerve root compression. At times the disease may progress to the point where radical type surgery is necessary, but most observers agree that with the present surgical techniques, all attempts at conservative management should be exhausted first.

In the past five years the author has treated over twenty such patients with cervical disk syndromes for whom surgical intervention was not considered advisable. In the majority of these cases, cervical traction had previously been tried and either gave no significant relief or caused an exacerbation of radicular pain. With only one exception, all these patients obtained moderate to complete relief by reinstituting cervical traction, often over the patient's protest, and by flexing the neck 20° to 30°.

It is interesting to speculate why such neck flexion is of benefit. Examination of the cervical skeleton reveals that the spinal foramina are anterior to the midline of the spinal canal. But the fulcrum is not at the facets. The articulating surfaces slide upon one another, the most fixed point being anterior at the vertebral body. Thus, on flexing the cervical spine, the long diameters of the foramina should be increased and thus cause an over-all enlargement. That this is so can easily be demonstrated by roentgenography. The following roentgenograms are illustrative.

Figure 1 shows the roentgenographic appearance of the C5 C6 foramen in an oblique view in a 31 year old normal control with the neck in about ten degrees of extension with no traction. The

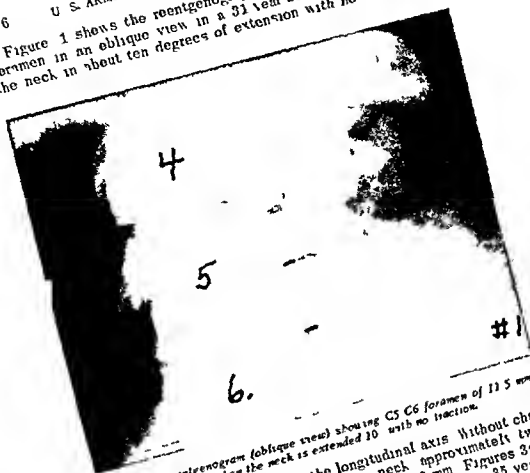


Figure 1 Roentgenogram (oblique view) showing C5 C6 foramen of 11.5 mm in length when the neck is extended 10° with no traction.

foramen measures 11.5 mm in the longitudinal axis. Without changing any factors except flexing the neck approximately twenty degrees the foramen (fig 2) now measures 13 mm. Figures 3 and 4 are similar oblique views of the C5 C6 foramen in a 35 year old master sergeant on active duty in the U S Army who had severe chronic cervical radiculitis with recurrent bilateral radicular pain for over nine years. Most of the pain had radiated into the thumb and index fingers. Neurologic examination revealed no atrophy, no weakness, no reflex changes and only minimal hypalgesia to pinprick over the C6 distribution on the right side. There were no long tract signs. Roentgenograms revealed arthritic changes in many of the cervical vertebra with narrowing of the C5 C6 interspace. The oblique views showed typical spurring at several of the foramina (fig 3). A myelogram revealed bilateral root cuff defects at C6 smaller cuff defects of C5 and C7 on the right, and midline bars at C4-C5 and C5 C6. Electromyography on the right revealed minimal lower motor neuron changes in the distribution of the C5 C6 and C7 roots. Hyperextension of the neck to 10° caused pain in both C6 root distributions. Figure 3 was taken

with the neck extended, and the C5 C6 foramen measured 8 mm. Figure 4 was then taken with the neck flexed  $20^{\circ}$ , and the foramen measured 10 mm. The patient was placed in cervical traction of 5 pounds with the neck flexed  $20^{\circ}$ , and the radicular pain subsided markedly within 24 hours.

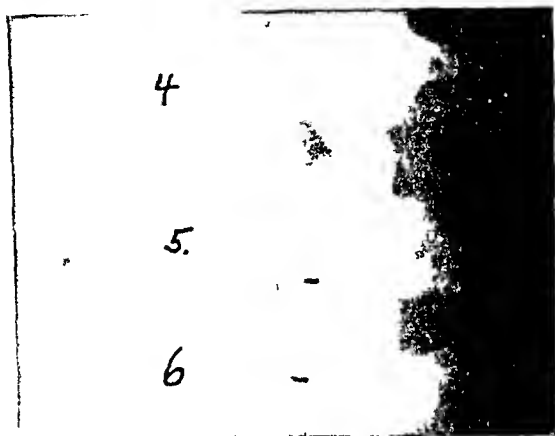


Figure 2. Roentgenogram (oblique view) of same person as in figure 1 except that the neck has been flexed about  $20^{\circ}$ . The foramen now measures 13 mm.

There are many ways to obtain neck flexion while in cervical traction. I prefer to use a hand halter with equal straps. Then the pulley at the head of the bed is raised so that with the patient lying on his back the cord forms an angle of at least  $45^{\circ}$  (fig 5). This puts the largest vector of force into the strap behind the occiput and flexes the neck. The head is supported on a pillow or folded sheets. The patient is told that he should feel most of the pull at the occiput. If there is much pull under the chin, the apparatus should be rechecked. Occasionally a sponge rubber pad is used over the occiput to prevent pressure over the greater occipital nerves. Usually no pad is needed under the chin. A small weight (5 lb for women and small men, 7 lb for heavy males) over a longer period of time is preferred. Most patients soon obtain benefit from the traction and wear it gladly, and with no severe pull on the chin strap, they learn to sleep in the harness. Patients are usually allowed out of traction to eat, go to the

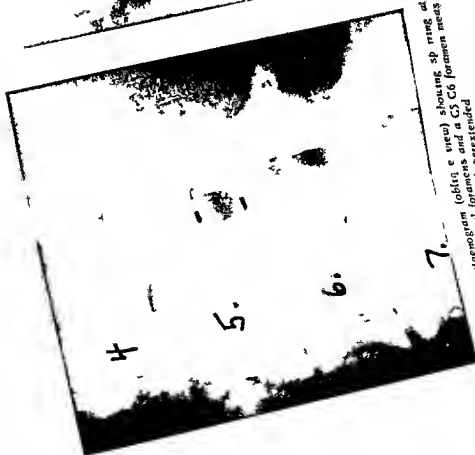


Figure 3 Roentgenogram (oblique view) showing a ring at the level of the cervical foramina and a C5-C6 foramen measuring 8 mm when the neck is hyperextended



Figure 4 Roentgenogram (oblique view) of same patient as in Figure 3 except that the neck has been flexed 20°. The foramen measures 10 mm

bathroom, or whenever the apparatus upsets them. If the pain is unilateral, turning the head slightly, usually away from the afflicted side, may increase the comfort obtained.

This traction technic is not original and is not presented as a "cure-all." Many patients have residual aches that do not subside or find that they need to continue the traction even after the acute episode of radiculitis subsides. Others find that as soon as they are ambulatory their attacks recur. It is believed, however,



Figure 5 Photograph showing traction apparatus arranged so that the cord forms an angle of about 45° at the pulley

that this type of cervical traction is superior to the usual traction in the long axis of the body in patients with true cervical radiculitis. This type traction with flexion has not been used, of course, in patients with large mid line lesions and signs of spinal cord involvement.

#### SUMMARY

Cervical traction is an important part of the conservative management of those patients with cervical radiculitis for whom surgery is not indicated. The usual methods of cervical traction, with the patient either sitting or in bed and with the pull in line





Figure 4 Roentgenogram (oblique view) of same patient as in figure 3 except that the neck has been flexed 20°. The foramen now measures 10 mm.



Figure 3 Roentgenogram (oblique view) showing spurring at the C5-C6 foramen and a C5-C6 foramen means several mm when the neck is hyperextended.



## Clinicopathologic Conference

U S Army Hospital Frankfurt, APO 757, New York N Y •

### LYMPHADENOPATHY AND FEVER

**Summary of Clinical History** A five month old white male infant was admitted to the hospital with initial symptoms of fever, lymphadenopathy, and irritability. He was born in Germany by a normal delivery, his birth weight was 7 lb, 11 oz. In the first weeks of life he had thrush and was treated with gentian violet. He gained weight steadily on breast feedings and remained well until the onset of his present illness. The parents and one sister, aged four, were living and well. The sister was stated to have had a calcified area in her chest, but a roentgenogram of her chest showed no calcification, and one of the mother's chest revealed normal findings. There was no tuberculosis, syphilis, rheumatic fever, allergic disorders, or diabetes in the family.

**First Hospitalization** When the patient was four and one half months old his mother noticed that he was irritable and feverish. He was examined by a physician, but no cause for the illness was found, and no treatment was given. His temperature continued as high as 105°F, and he was admitted to a hospital 10 days after onset of the illness.

Physical examination revealed cervical, slight axillary, and moderate inguinal lymphadenopathy. Except for a hot, dry skin

Col F Y Leaver MC USA Commanding Officer From the Laboratory Service Lt  
Col Roberto E Benitez MC USA Chief

with the long axis of the body, tend to cause neck extension and are not suitable in cervical radicular syndromes. Cervical traction with approximately twenty degrees of neck flexion seems to offer better results in this condition. This type of traction can easily be obtained with the patient lying in the supine position by merely raising the pulley on the usual traction apparatus.

## REFERENCE

- 1 Scuderi C. *Atlas of Orthopedic Traction Procedures*. C. V. Mosby Co. St. Louis Mo. 1954 pp 48-69

## ETHICS AND THE SCIENTIFIC MAN

There are certain ethical considerations which are generally recognized among scientists. One of the most important is that in reporting an investigation the author is under an obligation to give due credit to previous work which he has drawn upon and to anyone who has assisted materially in the investigation. This elementary, unwritten rule is not always followed as scrupulously as it should be and of fenders ought to realize that increased credit in the eyes of the less informed readers is more than offset by the opprobrium accorded them by the few who know and whose opinion really matters. A common minor infringement that one hears is someone quoting another's ideas in conversation as though they were his own.

—W I B BEVERIDGE  
*The Art of Scientific Investigation*  
 W W Norton & Co. New York N Y  
 1950 pp 140-141



## Clinicopathologic Conference

U S Army Hospital, Frankfurt APO 757, New York N Y \*

### LYMPHADENOPATHY AND FEVER

**Summary of Clinical History** A five-month old white male infant was admitted to the hospital with initial symptoms of fever, lymphadenopathy, and irritability. He was born in Germany by normal delivery, his birth weight was 7 lb, 11 oz. In the first year of life he had thrush and was treated with gentian violet. He gained weight steadily on breast feedings and remained well until the onset of his present illness. The parents and a sister, aged four, were living and well. The sister was stated to have had a calcified area in her chest, but a roentgenogram of her chest showed no calcification, and one of the mother's chests revealed normal findings. There was no tuberculosis, syphilis, rheumatic fever, allergic diseases, or diabetes in the family.

**First Hospitalization** When the patient was four and one-half months old his mother noticed that he was irritable and feverish. He was examined by a pediatrician, but no cause for the illness was found, and no treatment was given. His temperature continued as high as 105°F, and he was admitted to a hospital at the onset of the illness.

Physical examination revealed cervical lymphadenopathy and moderate inguinal lymphadenopathy. Except for a mild cough and

Col F Y Leary, MC, USA, Commanding Officer, U.S. Army Hospital, Frankfurt  
Col Roberto E. Benitez, MC, USA, Chief of Staff

and a temperature of 101°F physical findings were not otherwise remarkable

The red blood cells numbered 3 400 000/ $\mu$ l and the hemoglobin was 8.8 g/100 ml The white blood cell count was 52 850/ $\mu$ l with 54 per cent lymphocytes 2 per cent monocytes 1 per cent eosinophils, and 43 per cent neutrophils Repeated blood studies were essentially the same except that the red blood cell count fell to 2 500 000/ $\mu$ l The urine was normal Spinal puncture revealed clear spinal fluid with 31 cells (29 lymphocytes)/ $\mu$ l sugar was 74 mg/100 ml Roentgenograms of the chest revealed normal findings

On admission 7.83 mg (12 500 units) of potassium penicillin G every three hours and 0.12 gram of sulfadiazine every three hours were started The patient was hydrated and an attempt was made to control his temperature with baths and aspirin Nevertheless the temperature ranged from 101° to 105°F

**Second Hospitalization** After three days the patient was transferred to this hospital where it was noted that the liver was palpable four fingers breadth below the costal margin Other physical findings included moist rales throughout both lung fields, some generalized lymphadenopathy and marked pallor The spleen was not felt

Roentgenograms of the chest showed lobular prominence of the right hilar root consistent with lymphadenopathy, those of the abdomen showed a large soft-tissue tumor mass filling the left side from the subdiaphragmatic area to the iliac crest probably representing an enlarged spleen or kidney The skull and long bones appeared normal on roentgenograms

Therapy consisting of 200 mg of streptomycin sulfate orally every six hours was started in addition the child received 25 mg and 30 mg of streptomycin sulfate intrathecally There was no improvement and after four days streptomycin sulfate and penicillin were discontinued There was no change and 31.34 mg (50 000 units) of potassium penicillin G every three hours was started again Blood transfusions were also given

Blood studies showed a red blood cell count of 3 300 000/ $\mu$ l, hemoglobin was 10.5 g/100 ml The white blood cell count was 50 600/ $\mu$ l with 47 per cent neutrophils 51 per cent lymphocytes 1 per cent eosinophils and 1 per cent basophils A bone marrow examination revealed no evidence of leukemia The spinal fluid had normal concentrations of sugar and protein and produced no growth when cultured A sickle cell preparation and smears for malaria were negative A red cell fragility test had hemolysis beginning at 0.54 per cent and was complete at 0.28 per cent a

control began at 0.44 per cent and was complete at 0.28 per cent. The blood nonprotein nitrogen was 26 mg/100 ml, and total serum protein was 6.4 g/100 ml. The urine was normal on analysis. One blood culture was negative. After one week the patient was evacuated to a hospital in the United States.

### THIRD HOSPITALIZATION

**Physical Examination** The patient was a well developed, moderately well nourished, acutely ill infant with a temperature of 103°F. His breathing was rapid but not labored, and he had a frequent but not paroxysmal cough. His head measured 17 inches and the fontanelle was not tense. Pupils and fundi were normal. The tonsils were large but not infected. The ears and nose were normal. Many fine rales were heard throughout the lungs bilaterally. The heart was normal. The abdomen was slightly distended and tympanic. The spleen was large and firm, and extended halfway down to the pelvic brim. There was no cervical rigidity. There was generalized lymphadenopathy, and the epitrochlear and inguinal nodes were as large as almonds. Neurologic examination revealed no abnormalities.

**Laboratory Studies** Initially, the hemoglobin was 9.4 g/100 ml and the red blood cells numbered 2,600,000/ $\mu$ l. White blood cells were 24,150/ $\mu$ l, with 79 per cent neutrophils (15 per cent stab forms), 14 per cent lymphocytes, and 7 per cent monocytes. The blood smear revealed severe hypochromia with basophilic stippling. After blood transfusions, the red blood cell count was raised to 3,650,000/ $\mu$ l with 15 per cent reticulocytes, and the hemoglobin to 10.4 g/100 ml. The white blood cell count at this time reached a high of 33,300/ $\mu$ l, with 76 per cent neutrophils (30 per cent stab forms), 16 per cent lymphocytes, 6 per cent monocytes, and 2 per cent eosinophils. There was marked toxic granulation of the polymorphonuclear leukocytes. Platelets numbered 850,000/ $\mu$ l.

Two days before death the white blood cell count dropped to 2,650/ $\mu$ l, with 91 per cent lymphocytes, 5 per cent neutrophils, 3 per cent eosinophils, and 1 per cent monocytes, the red blood cells to 3,550,000/ $\mu$ l, the hemoglobin to 9.9 g/100 ml, and platelets to 199,350/ $\mu$ l. A Kohn test was negative. No malarial parasites were found on blood smears. The icteric index was 10, a red cell fragility test was normal, and agglutinations for Brucella were negative. The prothrombin time was 17 seconds with a control of 13 seconds. The urine was normal except for a few red blood cells seen in one specimen. The feces contained no parasites, ova, or occult blood, culture for typhoid and dysentery organisms was negative.

The spinal fluid was slightly cloudy, contained 13 cells (90 per cent lymphocytes)/ $\mu$ l, and had a slight increase in globulin.

Cultures of the spinal fluid and routine and acid fast stains of smears were negative. Throat culture showed *Micrococcus pyogenes* var *aureus*. Blood cultures were negative. *Streptococcus mitis*. Blood cultures were negative. Gastric washings contained no acid fast bacilli on smear or culture and no fungi on culture. Marrow from the right iliac crest showed erythropoiesis and a shift toward myelocytes in the myeloid elements. Early roentgenograms had revealed left pulmonary hilar adenopathy, but those taken on arrival at the last hospital showed a diffuse fine infiltrative process in both lung fields and the hilar adenopathy was less prominent. Roentgenograms of the abdomen showed a massively enlarged spleen that extended to the wing of the ilium. The liver was questionably enlarged. Roentgenograms of the skull were normal.

**Course in Hospital.** Penicillin and sulfadiazine therapy was started but it soon became apparent that these drugs were ineffective and they were discontinued. Regardless of medication the patient ran a high temperature for at least some part of each day throughout the entire course. He received many transfusions which had no dramatic effect. The need for frequent transfusions indicated that blood was being either lost or destroyed inasmuch as the reticulocyte count was high and the marrow was not hypoplastic. There was considerable productive cough and mucus was aspirated. Cyanosis was controlled with oxygen. The spleen progressively enlarged and reached the pelvic brim about 10 days after admission. Rales were always present in the lungs. The child was given 0.5 mg of aminopterin sodium daily for seven days without any helpful effect.

Several days before death the patient developed an erythematous rash mostly over the trunk and abdomen. In some areas it was petechial. Associated with this rash were a severe stomatitis and a generalized bleeding tendency. Vitamin K and liver extract therapy was begun. For the last three or four days prior to death the child was also jaundiced. The morning of the last day he appeared better. There was no longer bleeding from the mouth and mucous membranes. The rash had disappeared but the jaundice and fever were still present. The spleen was smaller and there was some regression of the lymphadenopathy. He died at 1305 hours that day about six weeks after the onset of illness.

#### DISCUSSION

**Doctor Knowles.** The problem is briefly that of a five month-old infant with fever, lymphadenopathy, a marked leukocytosis and a large mass in the left lower quadrant. This provokes an interesting differential

diagnosis encompassing most of the major groups of disease particularly one thinks of the devastating effects of systemic infection in this age group while being aware of the multiple complications of congenital abnormalities of the prognostically poor neoplasms and leukemias and of the often bizarre forms of metabolic disorders occurring in the young infant

The protocol first relates that a "disappearing calcific lesion" was present in roentgenograms of a sibling's chest. This is difficult to explain as the two diseases which might have first been suggested by opacities of the lung are tuberculosis and histoplasmosis both of which typically heal in the child by calcification, rather than by fibrosis as in the adult. We further have the findings of normal chest roentgenograms of the mother and a negative tuberculin test in the sibling. The further negative report of familial illness does not include the hemolytic diseases, and as there is a point in the case where congenital familial hemolytic anemia comes into the differential diagnosis, this might have been an important question to cover in the history.

The past history offers no clues except to state that the child was essentially well up until the onset of the present illness. The possibility that the infant's monilial infection occurred systemically is a remote one.

It may be assumed that the illness at its onset was somewhat insidious inasmuch as a physician neither recognized it to be serious nor offered treatment. By the time he was seen by the next doctor however he had developed a high temperature and appreciable lymphadenopathy. The blood cell count at this time was alarming with a marked leukocytosis but the differential is essentially normal for this age group. It was at this time that penicillin and sulfadiazine were started but apparently before obtaining important blood cultures. This may be why a diagnosis of septicemia could not be proved later. Even without meningeal signs, a lumbar puncture was wisely performed but the findings were essentially normal. If a diagnosis of miliary tuberculosis was considered at this time the normal sugar and protein determinations were important negatives. Usually in the meningeal form of the disease, the sugar is decreased below 50 mg/100 ml and the protein is increased above 50 mg/100 ml.

After enthusiastic hydration the patient was seen at the second hospital where in addition to previous findings, moist rales were heard in the chest and hilar prominence was noted radiographically. A roentgenogram of the abdomen apparently suggested further physical examination for a mass to the left side of the abdomen. It can be emphasized here that in examining a child's abdomen for the presence of a spleen, one starts at the iliac crest and works upward otherwise as in this infant the examiner will miss tremendously enlarged spleens and tumors, especially those associated with malaria, leukemia, Wilms's tumor and the reticuloendothelioses to name a few.



At this time an important negative finding of a normal skull and long bones was obtained. This helps to rule out an associated osteomyelitis secondary to sepsis and the Erlenmeyer flask bones of acute Gaucher's disease.

The attending physicians added streptomycin sulfate to the therapy and gave some of this medication intrathecally, presumably thinking of tuberculous meningitis. The spinal fluid sugar and protein however were normal.

Blood studies confirmed the leukocytosis with a slight increase in neutrophils. Tuberculous meningitis usually calls forth a monocytic response. Bone marrow examination failed to reveal leukemic cells as did the peripheral smears. This is strong evidence against the acute leukemias of childhood. A sickle cell preparation was also normal. It would seem unlikely that even if this white child were of Mediterranean descent and had the possibility of having a sickling trait, his present plight could be explained by such disease. Moreover the negative skull roentgenogram dispels this thought. Fragility tests were suggestive but were not confirmed later.

At a hospital in the United States rales were again noticed and persistently heard. This along with the appearance of a diffuse fine infiltrative process in the lungs strongly suggests the presence of bronchopneumonia. However these roentgenographic findings are often seen in the leukemias and other malignancies.

We are also told at this time that the child's fundi were negative. Again one of the reticuloendothelioses—Tay Sachs disease in which the cherry red macula is found—is ruled out.

Further physical findings only confirm previous examinations and laboratory examinations reveal that the leukocytosis shifted to younger cells of the granulocytic series. A poor prognostic sign is noted before death in the presence of marked toxic granulation of the neutrophils. We also note by the diminishing hemoglobin and increased icteric index that the red blood cells were being hemolyzed. The Kahn test and agglutinations for Brucella (and it is assumed for the other febrile agglutinins) were negative. If tuberculosis was still thought of the negative first and second strength tuberculin tests should have removed reasonable doubt as these tests are positive in approximately 92 and 99 per cent of active cases respectively. Blood cultures were again negative but in view of the antibiotics received it would be difficult to obtain positive results except with a tremendously overwhelming and continued bacteremia. Despite previous treatment the throat culture revealed a variety of organisms all cocci.

The hospital course was generally downhill. As an apparent desperate measure aminopterin sodium was given and probably accounted for the terminal agranulocytosis. Usually this drug is only given for

the acute leukemias, namely, the lymphogenous and myelogenous types. It does not seem to alter the course of the lymphosarcoma group.

Before summing up I should like to state that perhaps the major problem could have been solved by a lymph node biopsy. I would also like to have had an intravenous pyelogram of this patient to more completely delineate the abdominal mass and by so doing, help rule out a Wilms's tumor, a neuroblastoma, or other retroperitoneal mass.

The most frequent causes for splenomegaly and leukocytosis can be ruled out in this patient. (1) Mechanical causes such as rupture of the spleen may be discounted because of the length of the course and ancillary findings. (2) Infectious causes such as a septicemia resulting in a splenic abscess cannot be completely discounted. However, a bacteremia from typhoid, brucellosis, or tuberculosis usually does not call forth such a neutrophilia, a systemic fungus infection such as histoplasmosis is unlikely from the history and geography, and the protozoan infestations may likewise be excluded. (3) Hemie causes are unlikely in this patient. A hemolytic anemia is unlikely by nature of the course of the disease. Leukemia would appear to be a possibility in view of the treatment given the patient but is unlikely unless the results of further blood or bone marrow studies were withheld from the protocol. (4) Neoplastic causes such as a diffuse lymphosarcomatosis or primary splenic neoplasm are not ruled out, however, these would not provoke the leukocytosis found in this patient unless complicated by sepsis. Metabolic diseases such as the reticuloendothelioses are either not suggested by the history of this patient or were ruled out, except a fulminating Letterer-Siwe disease. This disease although usually associated with a neutropenia may well have been complicated by infection which would account for the neutrophilia.

Doctor Benitez: Doctor Spellman, perhaps you desire to discuss the roentgenographic findings.

Doctor Spellman: The lymphadenopathy or hilar enlargement noted on the chest films is apparently due to the same disease that caused the generalized lymphadenopathy. The most likely cause of the hilar adenopathy in this case would probably be tuberculosis, leukemia, or possibly Letterer-Siwe disease. The parenchymal infiltration was probably due to bronchopneumonia as rales were heard frequently on both sides of the chest. However, the infiltration possibly could be secondary to the original disease process. I do not remember having ever seen a case of Letterer-Siwe disease associated with parenchymal infiltration. Doctor Leaver, perhaps you have some remarks relative to Letterer-Siwe disease and parenchymal infiltration.

Doctor Leaver: In October 1952 Lackey, Leaver, and Farinaee<sup>1</sup> described for the first time two cases of eosinophilic granuloma of the

<sup>1</sup>Col. Charles E. Spellman, MC USA, Chief Radiology Service.

lungs along with an additional case of eosinophilic granuloma of bone with pulmonary findings. The radiologic picture is identical with that of Letterer-Siwe disease. Hand Schüller-Christian disease, Gaucher's disease, and other xanthomatoses consisting of a granulomatous infiltrate of nodular character with associated localized areas of emphysema and a slightly fibrotic background. The progress of these cases is very important as it is in this respect that the benign nature of eosinophilic granuloma is manifest as compared with the more malignant forms of the disease—that is, Letterer-Siwe disease and Hand Schüller-Christian disease.

**Dr Knowles diagnoses**

- 1 Bronchopneumonia
- 2 Septicemia complicating an underlying disease, either (a) neoplastic (lymphosarcomatosis) or (b) metabolic (Letterer-Siwe disease)

**Dr Spellman's diagnoses**

- 1 Tuberculosis
- 2 Leukemia
- 3 Letterer-Siwe disease
- 4 Bronchopneumonia

**PATHOLOGIC FINDINGS**

**Doctor Benitez:** This very intriguing case was seen at this hospital in 1948 and evacuated to Walter Reed Army Hospital where I had the opportunity to review the case and presented it originally at a clinicopathologic conference. The diagnosis entertained at this hospital was tuberculosis. At Walter Reed Army Hospital the diagnoses considered at first were histoplasmosis and leukemia. These were ruled out by various methods and finally after a node biopsy the true nature of the disease was determined.

At autopsy the salient features of the gross examination were as follows. The body was that of a well-developed, moderately well-nourished white male infant weighing 6,050 grams. The skin and sclerae were icteric. There were palpable lymph nodes in the neck, axillae, and groin. In the thorax the visceral and parietal pleurae were loosely adherent by fibrinous adhesions at the lower lobes. One lobe showed a hemorrhagic infarction. The liver weighed 375 grams, approximately twice the normal weight, and the spleen 110 grams, approximately six times the normal. The splenic capsule was opaque over the greater curvature. The mediastinal and retroperitoneal lymph nodes were small. In the mesentery they were larger, measuring up to 1 cm in diameter. The remainder of the gross examination was sketchy and no other findings of significance were noted.

On microscopic examination there was a striking proliferation of the reticuloendothelial elements (fig 1). This was noted particularly in the lymph nodes, spleen, liver, pleura, and adventitia of the stomach.

The predominant cells were nonlipid containing histiocytes often showing active phagocytosis of red blood cells. However in some of the mesenteric nodes some of these cells had the appearance of foam cells (fig. 2). In the serosa of the pleura and stomach the histiocytes were present in large numbers and showed a transition to fibroblasts. The pleura was thickened and thin interlacing collagen bundles were seen between the cells. There was also peribronchial infiltration with histiocytes and again the same fibrosis was noted in these areas. This was also noted in the spleen where the concentric layers of fibers and cells around the blood vessels in the malpighian corpuscles gave them

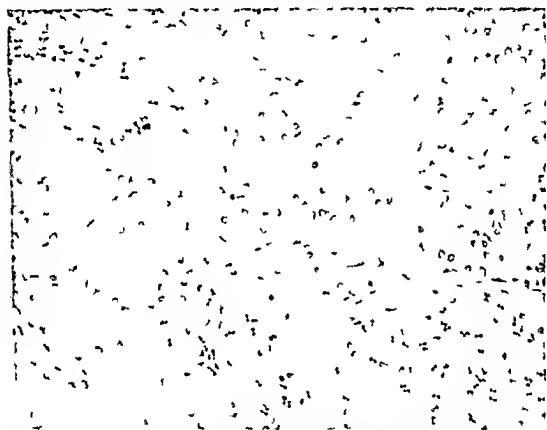


Figure 1 Lymph node showing marked proliferation of reticuloendothelial cells. These cells are pale and larger than the few lymphocytes seen in this field. (Hematoxylin eosin stain  $\times 250$ )

a granulomatous appearance (fig. 3). The sinusoids and the red pulp of the spleen were heavily infiltrated with histiocytes. Erythrophagocytosis was marked and considerable hemosiderin pigment was found within the cells. This was also found in the bone marrow and liver. In the latter the Kupffer's cells were prominent and laden with pigment. Many hepatic cells were also found to contain pigment. There was thickening of the leptomeninges with infiltration by histiocytes and mononuclear cells.

In many tissues other mononuclear cells were seen in a with the reticuloendothelial proliferation. Eosinophils we

small numbers in the lymph nodes and spleen. In the bone marrow in addition to the reticuloendothelial hyperplasia there was a marked increase in the number of eosinophils.

The intractable anemia can be explained on the basis of the marked erythrophagocytosis by the reticuloendothelial elements and the infiltration of the bone marrow. The blood destruction also explains the icterus noted clinically and the hemosiderosis noted histologically. The skin rash, petechiae and hemorrhages are not the type of skin lesions usually described in Letterer-Siwe disease but can be attributed to the aminopterin sodium. The drop in the white blood cell count can also be attributed to this drug.



Figure 2 Mesenteric lymph node with foamy histiocytes crowded in the peripheral sinus. (Hematoxylin eosin stain  $\times 500$ )

The entity represented by this case has been known as Letterer-Siwe disease for many years although in the past and even today it is being reported under various names. Other terms used are "nonlipoid histiocytosis," "noninfectious reticuloendotheliosis," et cetera. The reason for disagreement on nomenclature has been the varied clinical and histologic features as well as the failure to demonstrate a causative agent.

In recent years there has been a trend to relate this disease to Hand-Schüller-Christian disease and eosinophilic granuloma of bone. The former is classically a disease of infants usually characterized by

cranial defects, exophthalmos, and diabetes insipidus. The predominant cell in the lesions is a xanthoma cell rich in cholesterol. Eosinophilic granuloma is usually a solitary bone lesion of older children and occasionally of adults. The predominant cell is the eosinophil.

From 1937 to 1940 several European<sup>3, 4</sup> and American<sup>5</sup> authors pointed to the relationship between Letterer-Siwe disease and the Schüller-Christian syndrome. In 1942 Green and Farber<sup>6</sup> noted the relationship to eosinophilic granuloma of bone. In 1944 Jaffe and Lichtenstein<sup>7</sup> postulated that the various clinico-anatomic observations in these three diseases merely represent gradations in severity of the same

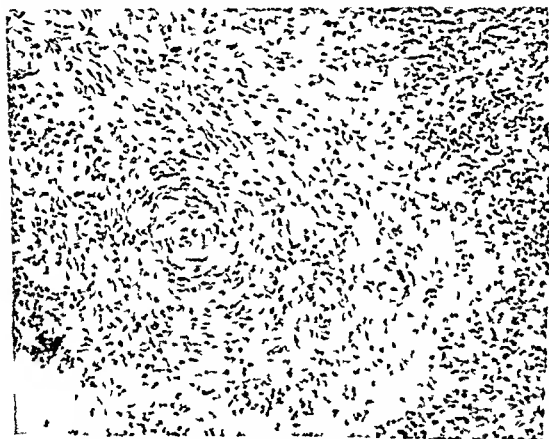


Figure 3. Fibrosis and reticuloendothelial proliferation in the spleen. (Hematoxylin-eosin stain  $\times 250$ )

disease process. Thus, on one hand Letterer-Siwe disease shows the most acute and severe manifestations; it is rapidly fatal and there is little or no lipid deposition in the reticuloendothelial cells. The Schüller-Christian syndrome represents a chronic form of the same disease with the presence of foam cells in the lesions that have not undergone fibrosis. Thirty per cent of these patients recover. Eosinophilic granuloma represents the most benign form with recovery usually occurring.

Lichtenstein<sup>7</sup> in 1953 reiterated the observations made in his first study. In this article he analyzed several recently reported cases of

these various syndromes and fit them into a pattern representing one disease which he named "Histiocytosis X" to emphasize the basic pathologic feature and the lack of a known cause. The classification he proposed is practical from the clinical and pathologic viewpoint. All the "atypical" cases of one or the other syndromes which have appeared in the literature can be easily placed in this classification. With this unity in mind it is easy to understand the transitions of one clinical and pathologic feature to another—e.g., an acute case of Letterer-Siwe disease going on to a chronic form of Schüller-Christian syndrome, eosinophilic granuloma presenting a chronic Schüller-Christian like picture and terminating with an acute course similar to Letterer-Siwe disease and various other possible combinations of clinicopathologic features.

No known cause for these three syndromes has ever been found. Infection has been considered but attempts to demonstrate pathogenic organisms and other infectious agents have been unsuccessful. The failure of antibiotic therapy in this case and the fruitless search for a pathogen illustrate this point. A disturbance of lipid metabolism has been considered and has now been generally discarded. Trauma has been incriminated in some cases especially in the single lesions of eosinophilic granuloma but most cases do not present a clear cut history of injury. Malignancy is difficult to ignore especially in the acute cases of the Letterer-Siwe type such as the present case. Other cases have shown leukemia like features and massive visceral infiltrations. Finally the relationship to age seems to direct attention to a possible endocrine imbalance. As Craig points out in the spectrum formed by the unified group it is noted that in the majority of cases the fatal cases have an age at onset of less than a year. If the visceral involvement is nonfatal the age at onset is somewhat later—a little over a year. In those with multiple bone involvement the age at onset is three years or more and finally when there are single bone lesions the age at onset may be around eight or nine years or even later. The occasional cases bridging the gap such as the reported cases of Letterer-Siwe disease in adults<sup>1,2</sup> are particularly thought provoking. Noteworthy in this case is the occurrence of foam cells, eosinophils and fibrosis.

#### Pathologic diagnosis

#### Histiocytosis X (Letterer-Siwe syndrome)

#### REFERENCES

1. Luck Y R W, Laver F Y and Francis C J. Eosinophilic granuloma of lung. *Radiology* 59: 504-512 Oct 1952.
2. Flor A G and Parent G C. Reticulo-endotheliosis type pleural infiltrate and osteolytic granuloma simulating metastatic carcinoma. *Hand Schüller-Christian* Riv di clin. pediat 35: 193-263 Mar 1937.
3. Glazman E. Infektiöse Reticuloendotheliose (Abt. Letterer-Siwe sch. Krankheit) und ihre Beziehungen zum Morbus Schüller-Christian. *Ann. paediat* 155: 18 Apr 1940.

- 4 Wallgren A Systemic reticuloendothelial granuloma nonlipoid reticuloendotheliosis and Schuller-Christian disease *Am J Dis Child* 60 471-500 Sept 1940
  - 5 Green W T and Farber S "Eosinophilic or solitary granuloma of bone" *J Bone & Joint Surg* 24 499-526 July 1942
  - 6 Jaffe H L and Lichtenstein L Eosinophilic granuloma of bone condition affecting one several or many bones but apparently limited to skeleton and representing mildest clinical expression of peculiar inflammatory histiocytosis also underlying Letterer-Siwe disease and Schüller-Christian disease *Arch Path* 37 99-118 Feb 1944
  - 7 Lichtenstein L Histiocytosis X Integration of eosinophilic granuloma of bone Letterer-Siwe disease and Schüller-Christian disease as related manifestations of single nosologic entity *A. M. A. Arch Path* 56 84-102 July 1953
  - 8 Craig J M In discussion Case records of Massachusetts General Hospital weekly clinicopathological exercises *New England J Med* 252 630-634 Apr 14 1955
  - 9 Dennis J W and Rosahn P D Primary reticuloendothelial granulomas with report of atypical case of Letterer-Siwe disease *Am J Path* 27 627-653 July-Aug 1951
  - 10 Goldner M G and Volk B W Fulminant normocholesteremic xanthomatosis (histiocytosis X) report of incidence in aged woman *A. M. A. Arch Int Med* 95 689-698 May 1955
- 

### THE MENACE OF NODULAR GOITERS

How great is the menace of nodular goiters particularly single adenomas still remains a debated question. No doubt the majority of patients even if not treated will survive without malignant changes ever developing within the gland. Yet the high incidence of carcinoma reported by many writers, especially appearing later on in nodular goiter particularly of the single type must give us pause. We have seen so many patients whose histories indicate that they have had nodular goiters for years which could have been readily enucleated and who now come to us with extensive and frequently hopeless carcinomas that we are compelled to feel that a thyroidectomy should be carried out in all instances of adenomatous goiter.

—J REED BABCOCK M D  
in *Pennsylvania Medical Journal*  
p 1170 Dec 1954



## SERVICE ARTICLES

### PRESENT DAY MILITARY OBLIGATIONS

DANIEL C. ELKIN M. D.

**N**O President of the American College of Surgeons or in deed the head of any other responsible medical organization will have done his full duty today if he does not speak out soberly advisedly and with due consideration on another subject, the role and obligations of all physicians in a world that may not be at war but is surely not a world at peace. In the event of thermonuclear warfare and an attack upon the industrial cities of the country which make up the target areas there will be a flood of casualties over the target areas battle in the history of the world ever before produced. The surviving casualty load will far exceed the immediately available medical resources. The immediate problems but it will require the and thermal burns are surgical problems—all of us who survive—services not only of surviving surgeons—but it will require the but of others also to cope with the situation. Battlefield principles must be applied. Preferential care in the system of priorities must be given to those who can be returned to duty rather than to those who are close to death.

The surgical profession has a heavy responsibility in planning and training and indoctrination against a day of disaster. Preparations may be puny but they may turn the scale for or against national survival or destruction in an all-out war. If any of us are to survive, it will be because in this time of specious peace all of us have set our hands to the task while there is still time.

There is another point to be made in this connection. I think that we err greatly and are derelict in our duties those of us who stand in the kind of office in which by your graciousness I find myself tonight if we do not firmly and unequivocally take the position that the young man who now goes into medical practice must face and accept the almost inescapable fact that before he is free to follow his own desires there is every chance that he may be called upon to give his time and service to the Armed Forces of the country.

Extract from the Presidential Address to the American College of Surgeons delivered at the San Francisco Meeting, October 1956.  
Dr. Elkin is at Elkin Place, Lancaster, Ky.

This is the situation. Every 18 year old must register for military service. The prospective physician can request deferment while he finishes high school, while he completes his premedical work, while he is in medical school, while he serves his internship, and, perhaps, while he serves a year or more of residency. He will be granted these successive deferments without question if his grades and his performance warrant it. But, after he has been deferred for those nine years or more, there will come the almost inevitable day when he must enter some branch of service. I grant you that the situation as it exists is unfair and discriminatory. If the student desires to fulfill his military obligations when he is 18, and fulfills them then, it will profit him nothing when he has become a Doctor of Medicine. For all practical purposes he is in double jeopardy. He must still do service for two years as a medical officer. From that obligation there is little chance of escape.

Unfair? Yes. Wastage and inefficiency in the use of medical officers? Yes, there is undoubtedly some basis for this charge. But, I ask you, what are we going to do about it? The Act of Congress by which physicians must serve in the Armed Forces will expire in June 1957, but it will still remain the obligation of the Government to maintain a medical service with a balanced structure. The men in the service must be cared for in peacetime as well as in war. The Surgeons General of the Army, the Navy, and the Air Force are charged with these responsibilities. We of this College will be derelict in our own duties if we do not hold up their hands.

How best can we fulfill the obligations of the College in this regard? In two ways, I would say. First, we must take the position, automatically and without cavil, that as a matter of course every matriculating medical student must look forward to two years of service in the Armed Forces. Second, we must take our stand firmly against the cynical notion that is rather popular at this time, that these two years are a waste of time, almost a backward step in one's medical career. It is never a waste of time to serve one's country. I should like to see every instructor in every medical school devoting some of his teaching effort to refuting these notions and to emphasizing the concept that if these years are a waste of time, it is a reflection on the individual medical officer and on those who failed to prepare him for his military obligations rather than a reflection on the services. Medical schools must take cognizance of the world. This is a fundamental problem of orientation, and it is one to which I should like to make a constructive contribution.

There exists no vacuum in the medical school curriculum as I am well aware for courses in military medicine. There is no reason however why certain matters of military medicine cannot be integrated into existing courses of medicine and surgery. We made a serious mistake in World War II in that we failed to use the surgical lessons of World War I. It is sadly true that the lesson of history is that the lesson of history is never learned.

As a matter of fact there is a great deal in the story of surgery in World War II that is applicable to peacetime practice. Further more given the chance medical students show a surprising interest in that story. I have myself since the war devoted a good deal of time to recording my own surgical experiences in it and to hounding my confreres into reporting theirs. Some of these surgical histories are already available. Others will appear shortly. Still others are in preparation. You will find them interesting and profitable reading whether or not you went to the wars and if you will permit me the plug the Government Printing Office will be glad to sell them to you at a remarkably reasonable price.

---

### THE INCIDENCE OF ALLERGY

Allergy is a common condition. Less frequent probably than some enthusiastic practitioners would claim and more common than is realized by a considerable number of physicians. There may be many who disagree regarding the classification of some conditions as allergic but when the elimination of questioned conditions has been made by conservative men there still remains a hard core of approximately 10 per cent of the population who suffer from one or another condition unquestionably allergic.

—J HARVEY BLACK M D  
in Illinois Medical Journal  
p 5 Jan 1954

# A PSYCHIATRIC STUDY OF A RETRAINING COMMAND

NATHAN SCHLESSINGER *Lieutenant MC USNR*  
DAVID BLAU *Lieutenant MC USNR*

**T**HE OPPORTUNITY to serve as a medical officer at a naval retraining command, which serves as a place of confinement for courts martial prisoners with minimum sentences of four months, is a unique experience for a psychiatrist. Most psychiatrists have had little contact with this type of work in an ordinary civilian or Navy practice. Stresses arise in confinement which are unparalleled in everyday life, and serious emotional disturbances are not uncommon.

From our experiences as psychiatrists attached to this retraining command, we derived certain attitudes and impressions that form the basis of this article. Although some of our observations may be specifically pertinent to this retraining command, we believe that our comments may have general bearing on all such commands operated by the Navy.

Five hundred consecutive new arrivals appearing between October 1955 and January 1956 were routinely screened with an extensive personal history questionnaire completed by the prisoner himself, and with a social history and service record review by the Navy Classification Specialist. After this information was collected, each of the prisoners was seen briefly in psychiatric interview, and an appropriate diagnosis and recommendation for restoration, clemency, or administrative discharge were made.

## CHARACTERISTICS OF PRISONERS

In brief, the average prisoner was young and had spent a relatively short time in the service. The majority had been awarded punitive discharges, and almost half the population were the product of broken homes (table 1). Many reported difficulties in school prior to entering the service, and a considerable number indicated a significant history of alcoholism. A large majority were confined for AWOL and desertion. Diagnostically, they fell into the category of severe character and behavior disorders.

---

From U S Naval Retraining Command U S Naval Base Portsmouth N H. Dr Schlessinger is now at 5327 South Dorchester Chicago 15 Ill.

Of the 500 prisoners studied 112 were being restored to duty. These men were compared with the over all group. The only significant differences occurred in the distribution of the ages and the psychiatric diagnoses of the men. The restorees tended to be

TABLE 1 Characteristics of 500 prisoners at a retraining command

Characteristics		Per cent
Age	Under 21	69
	Over 21	31
Education (grades)	0-8	38
	9-11	57
	Over 11	5
Marital status	Single	76.3
	Married	20.4
	Divorced	3.3
Branch of service	U S Marine Corps	49
	U S Navy	51
Length of service	Under 6 months	5
	6 to 24 months	58
	Over 24 months	37
Number of previous courts-martial	0	34
	1	32
	2	20
	3	9
	4	5
	5	<1
Current offense	Desertion and AWOL	86
	Larceny	8
	Escape from confinement	3
	Disrespect to a superior	3
	Assault	2
	Forgery	<1
	Rape	<1
	Sodomy	<1
	Murder	<1
	Indecent exposure	<1
	Asleep on post	
	Absent from place of duty	
	Bad conduct or dishonorable discharge	77.6
	Automatic back to duty	22.4
Type of disposition	Under 90	10
	90-110	69
	Above 110	21
Revised Beta scores	Civil offenses	21
	Reform school	7
	Significant history of alcoholism	43
Previous social adjustment		

TABLE 1 Characteristics of 500 prisoners at a retraining command  
—Continued

Characteristics		Per cent
Broken home		44
Previous psychiatric treatment or consultation		4
Psychiatric diagnosis	Passive-aggressive reaction	25
	Emotional instability	18
	Immaturity reaction (not further classified)* **	18
	Passive-dependency reaction	8
	Inadequate personality	7
	Antisocial personality	22
	Alcoholism (chronic)	16
	Acute situational maladjustment	14
	Schizoid personality	14
	Sexual deviation (homosexuality)	1
	Chronic anxiety reaction	1
	Neurotic depressive reaction	1
	Aggressive reaction	1
	Paranoid state	1
	Asocial personality	1
	Schizophrenic reaction (not elsewhere classified)	1
	Normal range	1

Fifty-one per cent reported trouble in school including as a major and difficulties with the teachers or other pupils.

Only the most serious offenses of each man were considered seriously serious violations of the Uniform Code of Military Justice and were counted separately. Offenses like breaking restriction and failure to follow orders were omitted.

\* Twelve of this group were recommended for admission to the military.

\*\* Only serious offenses were included. The rest of the offenses were minor offenses like entering, auto theft and larceny.

This diagnosis was used to describe men who were not in the usual difficulties of adolescence and might be expected to have serious difficulties in the future as they resolve their adolescence problems.

younger (78 per cent were under 21 years of age) and were considered to fall within the normal range for the areas compared, the two groups were not significantly different.

#### DISPOSITION OF PFTC, ET

A great number of the retrainees were men who were marginal manpower who could not do the work of the beds, do inferior work, and get into the firm and the other studies<sup>1-3</sup> have described the problems of the men in the service in attempting to do the work of the beds. It was not surprising that the retrainees were in disciplinary trouble and in confinement.

It was recommended that about 10 per cent of the restorees be discharged from the service. This figure was modest in view of the number of psychiatrically handicapped men interviewed. If the policy regarding administrative separation would have permitted it a larger number would have been recommended.

Many rational arguments were raised to oppose discharging men administratively. Some considered an undesirable discharge to be more punitive than a bad conduct or dishonorable discharge. Others objected on the grounds that an administrative discharge permitted men to escape from a contracted agreement to serve their country and to obtain the benefits of an honorable discharge. While it was true that these men would not serve out their enlistment if they were separated, it appeared likely that many of them would fail to do so after they were restored to duty. In addition, many of those men would be ultimately faced with further confinement and finally a punitive discharge.

We noted a tendency on the part of staff personnel to deal harshly with provocative prisoners who loudly proclaimed that they were not motivated for further service and were interested in being discharged. Such demonstrations frequently resulted in a prisoner being restored to duty as a form of further punishment. It was difficult for staff personnel to understand that such antagonistic behavior was part of the pathologic personality disorder of the inmate.

Duty personnel at retraining commands are concerned primarily with the problem of restoring men to duty. They are concerned about the number of prisoners who can be restored and use this number as a sign of the success or failure of their mission. Unfortunately, this is an unrealistic goal from a psychiatric view point. Many of the prisoners are suffering from serious personality disorders, to ask such people to adjust to military life successfully is similar to requiring men crippled by heart disease to run daily obstacle courses. Until recent times even among psychiatrists there was hesitation in recognizing that character and behavior disorders represent serious emotional difficulty. It was therefore understandable that duty personnel should feel that "acting out" could be readily controlled by conscious means.

Retraining commands are fortunate in being adequately staffed with personnel who can carry out the entire process of administrative separation. The presence of such experts as the legal officer, psychiatrist, psychologist, Red Cross representative and administrative personnel affords an ample opportunity of obtaining a broad picture of the inmate's personality and type of performance before confinement. The work supervisors and other duty personnel provide a picture of the adjustment in confinement. This careful screening and evaluation of each case should prevent the unnecessary separation of personnel who might be of value to the service.

It is understood that the criteria for administrative separation must vary with the manpower needs of the service. In time of peace, when the selection criteria for entrance into the service are relatively high, administrative separation might well be used more frequently throughout the service. Certainly in dealing with serious character and behavior disorders it would be well to consider greater use of this kind of action in the future.

### EFFECTS OF CONFINEMENT

Confinement provides a repressive environment in which the prisoners have lost their primary external objects for psychosexual gratification. Opportunities for using the familiar technique of acting out, so commonly employed by these men to handle their problems, are of necessity diminished by this repressive atmosphere. In spite of the external controls, however, some of the men continued to act out in confinement and became disciplinary problems. In general, these men had difficulty in controlling impulsive sexual and aggressive behavior. Some of the men in confinement experienced considerable internal anxiety, but usually there was an admixture of acting out and internally experienced anxiety.

Depressive reactions in confinement occurred rather infrequently and were hardly ever of serious proportions. Psychotic reactions in confinement were also observed infrequently. As a general rule, those prisoners who became psychotic in confinement rapidly recovered when they were removed from confinement and placed in a hospital situation. It was our feeling that recovery occurred because a specific kind of stress, namely, confinement, was removed. We are aware that some people would consider the possibility that those prisoners exhibiting psychotic symptoms might be malingering, but usually the ones who did develop psychotic reactions were described as either "borderline psychotics" or "prepsychotics" in their initial screening interview. The most typical psychotic reaction seen was that of paranoid schizophrenia.

Anxiety reactions frequently appeared a few weeks before a prisoner's release from confinement and were noted more often in those men who were receiving punitive discharges. Usually these feelings were related to the men's fear of losing control of impulses upon leaving confinement, as well as to the realistic problems confronting them in regard to their punitive discharges. Most of the prisoners expressed concern about obtaining a job, and many were afraid to face their families. It was often noted that they submitted requests to see the psychiatrist and complained of generalized nervousness, insomnia, aggressive impulses toward duty personnel, or a desire to change their living quarters. Such requests usually indicated mounting internal anxiety, which was frequently followed by acting out if the requests were not immediately handled.



The large majority of prisoners in confinement do not experience pathologic anxiety reactions nor do they become disciplinary problems as a result of their acting out. Many of the men react with an acceptance of the confinement situation. Confinement itself tends to protect people from their own impulses as well as to provide for their dependent needs. In addition the prisoners are provided with a target namely the duty personnel, for covert expressions of hostility. There is a considerable amount of group support among prisoners that enables the majority to remain out of disciplinary trouble.

The problem of malingering becomes extremely important when the prisoner is referred for psychiatric evaluation as the result of disciplinary difficulties. It is always difficult to separate the conscious motivation and desires of the prisoner from his unconscious problems. Disciplinary difficulties frequently are manifestations of increasing tensions arising as the result of the need to control forbidden impulses. It often is difficult for custodial personnel, who have been dealing with these men as conscious and willful individuals to realize that they have been acting out their unconscious emotional problems and are suddenly sick enough to require psychiatric attention. In general although malingering often has the outward appearance of a dramatic conscious attempt to avoid responsibility it is usually associated with serious unconscious emotional problems. As a result of the lack of awareness on the part of duty personnel men with psychiatric problems were often viewed as deliberately provocative and threatening and were usually handled in a repressive fashion.

We decided to study those men who were involved in disciplinary action of a serious nature and try to determine whether men with certain types of character disorders were more prone to cause trouble in confinement. Table 2 compares the psychiatric diagnoses of 100 men who had been reported for disobedience of orders at the retraining command with the diagnoses of the 500 men catalogued in table 1. The latter group provides a picture of the percentage of various character disorders scattered throughout the institution. The offense of disobedience was selected because it usually represents an outright refusal to co operate with authority figures.

Table 2 shows that men diagnosed as having passive aggressive reaction emotional instability reaction and antisocial personality were more frequently reported for disobedience than one would expect from their normal percentage in the population. It was also significant that all of the men who became psychotic in the institution were reported for disobedience.

Another interesting group made up of those men who were not reported for disobedience as frequently as one might predict from their distribution in the population were those diagnosed as

TABLE 2 *Psychiatric diagnoses of 100 men reported for disobedience during confinement compared with those of the total group studied*

Diagnosis	Reported for disobedience (per cent)	Total group studied (per cent)
Passive-aggressive reaction	32	25
Emotional instability reaction	25	18
Immaturity reaction (not further classified)	9	18
Inadequate personality	8	7
Antisocial personality	8	22
Schizophrenic reaction (not elsewhere classified)	3	<1
Passive dependency reaction	2	8
Schizoid personality	1	14
Sexual deviation (homosexuality)	1	1
Aggressive reaction	1	<1
Addiction (drug)	1	<1
Normal range	9	12.5

having either immaturity reaction (not further classified) or passive dependency reaction. One possible explanation for this might be that these two groups were composed of dependent men who received a great deal of gratification in confinement by having their oral needs satisfied and therefore did not have to resort to further acting out.

#### PRESENT PROGRAM

Rehabilitation efforts are difficult when men being prepared for return to duty after confinement are subjected to the same physical and disciplinary environment during confinement as those who will be returned to civilian life with punitive discharges. There has been some recognition of this problem at this retraining command, where a physically separate unit (Camp Langdon) was established. This unit functions specifically for the purpose of providing retrainees with an atmosphere approaching normal service life, and prepares them to return to the duties expected of them. Men with punitive discharges are retained in a closely supervised institution and undergo a completely different experience.

It is our opinion that, even though the two groups are structurally similar, their separation is necessary. It is that those men who are being returned to duty be prepared

chi

The large majority of prisoners in confinement do not have pathologic anxiety reactions nor do they have secondary problems as a result of their acting out. Many react with an acceptance of the confinement situation. The environment itself tends to protect people from their own weaknesses as well as to provide for their dependent needs. In general, prisoners are provided with a target, namely the guard, for covert expressions of hostility. There is a constant need for group support among prisoners that enables them to remain out of disciplinary trouble.

The problem of malingering becomes extremely acute when the prisoner is referred for psychiatric evaluation because of disciplinary difficulties. It is always difficult to distinguish between conscious motivation and desires of the prisoner and unconscious problems. Disciplinary difficulties are often manifestations of increasing tensions arising as the prisoner attempts to control forbidden impulses. It often is the job of the personnel who have been dealing with these prisoners to help them and willful individuals to realize that their unconscious emotional problems are serious enough to require psychiatric attention. Malingering often has the outward appearance of a conscious attempt to avoid responsibility with serious unconscious emotional problems. Lack of awareness on the part of disciplinary difficulties was often viewed as a psychiatric problem and were often viewed as threatening and were usually handled as such.

We decided to study those men who had a disciplinary action of a serious nature with certain types of character traits that cause trouble in confinement. The diagnoses of 100 men who were referred to the orders at the retraining center are catalogued in table 1. The percentage of various types of character traits in the institution. The cause of the trouble usually referred to by the authority figures.

Table 2 shows the reaction, emotional stability, and the type of behavior that would expect to be seen in the institution was also the most common.

An analysis of the reported behavior and their distribution.



# EXPERIENCES IN PROVIDING SALAD VEGETABLES TO AMERICAN FORCES IN JAPAN

LYMAN P. FRICK Lieutenant Colonel MSC, USA  
GOTTLIEB L. ORTH Colonel MC USA  
NEIL O. WILSON Colonel VC USA  
WALTER F. MALIZIA Captain, MSC USAR  
RALPH O. ANSLOW Lieutenant Colonel VC, USA

IT IS probably not generally realized that providing green vegetables in the diet of troops can become an important military problem. A salad of lettuce, tomatoes, green peppers, carrots, and green onions mixed with a savory dressing is as great a morale factor as fresh milk, meat, and ice cream. United States servicemen become accustomed to eating fresh raw vegetables in their homes before they enter military service and they expect to see these foods regularly wherever their tours of duty take them.

The problem of supplying fresh vegetables to troops in the Far East Command has been complicated by several factors. Ordinarily, fresh vegetables grow profusely throughout Japan, Korea, and the Ryukus Islands during the proper seasons. Nothing would seem more natural than to be served these foods in troop messes and clubs except that nearly all fresh vegetables grown in the Orient are potentially contaminated, due to the use of night soil (human excreta) as fertilizer. This is one phase of orientation that most troops remember, at least in part, although many persons may later become careless in their off post eating habits.

Night-soil fertilization has been the prime concern. Intestinal parasitism and other enteric infections that may be transmitted by contaminated foods are common in the Far East, and surveys of the Japanese civilian population beginning in late 1945 indicated that appreciable increases in the incidence of some of these infections had occurred during the war years. As a result of the

From the 406th Medical Laboratory and Preventive Medicine Division and  
Veterinary Branch, Office of the Surgeon, USAFPE/8th U.S. Army (Rear) APO 343 San  
Francisco, Calif. Col. Frick is now assigned to Sixth Army Area Medical Laboratory  
Fort Baker, Calif.

shortage of medicines and physicians and concomitant curtailment of health programs during World War II, the occurrence of ascariasis, for example, had increased from a prewar average incidence of about 36 per cent to nearly 80 per cent.<sup>1</sup> Inasmuch as almost all repatriated Japanese troops and laborers from the islands of the Pacific and the Asiatic mainland were infected with some type of intestinal parasite, their return undoubtedly brought to the home islands many amebic carriers.

During the early occupation years the policy of American authorities was to take as little food as possible from the then meager resources of the Japanese. To complicate the problem further, water supply and housing were in a chaotic state and engrossment with general sanitation left a low priority for laboratory or field studies to determine the safety of local foods. All of these factors precluded extensive purchases of fresh produce by the military for troops in the Far East Command.

The problem of supplying fresh vegetables to troops in the Far East has had to be handled differently at different times. The purpose of this report is to survey the methods whereby these foods were obtained prior to 1955 and thereafter, and to review medical and laboratory data that might affect vegetable procurement.

#### PROCUREMENT OF VEGETABLES PRIOR TO 1955

Between the end of 1945 and early 1955 the only officially approved sources of vegetables, and in particular salad vegetables, for general troop use and commissaries were two hydroponic farms in Japan and produce from the United States. Quantities were constantly limited by the high cost of establishing additional hydroponic farms and the shortage of refrigerated transoceanic shipping space. An additional limitation was the short storage life of highly perishable items when imported from the United States. As an example, a considerable proportion of all tomatoes was lost due to spoilage even when the fruit was picked green and shipped under refrigeration. Additional spoilage occurred during transshipment to Korea. These conditions continued until early 1955.

During the same period, eating establishments operated by clubs, post exchanges, and approved Japanese hotels and restaurants served fresh vegetable salads throughout the year. Eating places operated by the military services were authorized to purchase many types of local produce on a warranty basis. It was required that vegetables be grown in chemically fertilized soils, or on Japanese hydroponic farms using only chemical fertilizers. Army Veterinary Corps inspections were made on this produce at wholesale warehouses or at the ultimate destination, but often

# EXPERIENCES IN PROVIDING SALAD VEGETABLES TO AMERICAN FORCES IN JAPAN

LYMAN F FRICK *Lieutenant Colonel MSC USA*  
GOTTLIEB L ORTH *Colonel MC USA*  
NEIL O WILSON *Colonel VC USA*  
WALTER F MALIZIA *Captain, MSC USAR*  
RALPH O ANSLOW *Lieutenant Colonel VC USA*

IT IS probably not generally realized that providing green vegetables in the diet of troops can become an important military problem. A salad of lettuce, tomatoes, green peppers, carrots, and green onions mixed with a savory dressing is as great a morale factor as fresh milk meat and ice cream. United States servicemen become accustomed to eating fresh raw vegetables in their homes before they enter military service and they expect to see these foods regularly wherever their tours of duty take them.

The problem of supplying fresh vegetables to troops in the Far East Command has been complicated by several factors. Ordinarily fresh vegetables grow profusely throughout Japan, Korea, and the Ryukus Islands during the proper seasons. Nothing would seem more natural than to be served these foods in troop messes and clubs except that nearly all fresh vegetables grown in the Orient are potentially contaminated, due to the use of night soil (human excreta) as fertilizer. This is one phase of orientation that most troops remember at least in part, although many persons may later become careless in their off post eating habits.

Night-soil fertilization has been the prime concern. Intestinal parasitism and other enteric infections that may be transmitted by contaminated foods are common in the Far East and surveys of the Japanese civilian population beginning in late 1945 indicated that appreciable increases in the incidence of some of these infections had occurred during the war years. As a result of the

From the 406th Medical General Laboratory and Preventive Medicine Division and  
Veterinary Branch, Office of the Surgeon, USAFPE/8th U S Army (Re 2) APD 343 San  
Francisco, Calif. Col. Frick is now assigned to Sixth Army As a Medical Entomologist  
Fort Baker, Calif.

shortage of medicines and physicians and concomitant curtailment of health programs during World War II, the occurrence of ascariasis, for example, had increased from a prewar average incidence of about 36 per cent to nearly 80 per cent.<sup>1</sup> Inasmuch as almost all repatriated Japanese troops and laborers from the islands of the Pacific and the Asiatic mainland were infected with some type of intestinal parasite, their return undoubtedly brought to the home islands many amebic carriers.

During the early occupation years the policy of American authorities was to take as little food as possible from the then meager resources of the Japanese. To complicate the problem further, water supply and housing were in a close state and engrossment with general sanitation left a low priority for laboratory or field studies to determine the safety of local foods. All of these factors precluded extensive purchases of fresh produce by the military for troops in the Far East Command.

The problem of supplying fresh vegetables to troops in the Far East has had to be handled differently at different times. The purpose of this report is to survey the methods whereby these foods were obtained prior to 1955 and thereafter, and to review medical and laboratory data that might affect vegetable procurement.

#### PROCUREMENT OF VEGETABLES PRIOR TO 1955

Between the end of 1945 and early 1955 the only officially approved sources of vegetables, and in particular salad vegetables, for general troop use and commissaries were two hydroponic farms in Japan and produce from the United States. Quantities were constantly limited by the high cost of establishing additional hydroponic farms and the shortage of refrigerated transoceanic shipping space. An additional limitation was the short storage life of highly perishable items when imported from the United States. As an example, a considerable proportion of all tomatoes was lost due to spoilage even when the fruit was picked green and shipped under refrigeration. Additional spoilage occurred during transshipment to Korea. These conditions continued until early 1955.

During the same period, eating establishments, canteens, clubs, post exchanges and approved Japanese homes and restaurants served fresh vegetables obtained throughout the year. Eating places operated by the military service were authorized to purchase many types of local produce on a warranty basis. It was required that vegetables be grown in chemically fertilized soils, or on Japanese hydroponic farms using only chemical fertilizers. Army Veterinary Corps inspections were made on this produce at wholesale warehouses or at the ultimate destination, but often



little or no knowledge of the real origin of the vegetables was possible. Salad vegetables purchased under warranties were not authorized for use in troop messes or commissaries.

Troop messes in Japan and Korea have always served nutritious meals. This was true even during the most severe battle conditions of the Korean campaign. However, fresh vegetables often were unavailable in some areas for days or weeks, particularly during the nongrowing season when all vegetables came from the United States.

### PROCUREMENT ON A TRI SERVICE BASIS

By 1952 or 1953 vegetable production in Japan and Okinawa had recovered to the point where actual surpluses developed in Japan and relatively large purchases could be made without adverse effects on the Japanese market. If safe sources for vegetables could be established, troops could be supplied more liberally and at a great saving. The main problem, however, lay in developing these safe sources. Chemical fertilization seemed to be an obvious requisite. Rudolf Falk and Ragotzke<sup>1</sup> in an article published in 1951 had concluded that vegetables grown under conditions of surface sowage contamination showed no higher coliform contamination than those grown on normally farmed soils. Inasmuch as this study had been made in the United States it might not be entirely applicable to the situation in the Far East, especially in view of the exceedingly common occurrence of gastro-intestinal infections in the latter area.

It could be assumed that nearly all vegetables are grown in the Far East under conditions of night-soil fertilization and there is a mass of evidence to incriminate this practice in the transmission of enteric infections in areas of high endemicity. Therefore indiscriminate purchases of salad vegetables were not deemed advisable. Furthermore, nearly all arable soil in Japan was probably already contaminated with enteric organisms several of which are known to persist in soils for relatively long periods. Such soils could be potentially hazardous even if chemical fertilizers were used. Hence it was evident that if adequate supplies of vegetables, especially salad vegetables, were to be procured locally, principal consideration had to be given to establishing appropriate standards for their production and purchase.

As a result of a series of meetings attended by representatives of the Army, Navy, and Air Force, a tri service directive<sup>2</sup> was published in late 1954. This publication marked the first attempt in this theater to obtain uniformity between the three services in policies governing the procurement of local foods. The directive assigned central control of approved sources of foods to the veterinary branch of the Surgeon's Office, U S Army Forces,

Far East, 8th Army (Rear), and classified the types of vegetables that could be purchased without reference to approval of source and those that could be obtained only from approved sources. In addition, the directive established minimum sanitary requirements for the production, harvesting, processing, and delivery of salad vegetables. It was specified that growing plots had to be so located that they would not receive drainage from adjacent areas where night-soil fertilization was practiced. Growers were required to furnish a warranty that chemical fertilization had been practiced exclusively for at least four months prior to approval and would be continued for the duration of their contracts. Processing of vegetables on farms was prohibited; instead, growers were required to deliver their produce as harvested to processing sheds. Operators of these were required to comply with certain standards of sanitation, and were permitted only to process vegetables from approved farms. It was also specified that produce had to be delivered in clean, covered vehicles, and use of these for transporting contaminated materials was prohibited.

Japanese farms consist of a number of plots which may range in size from about 100 square feet to a maximum of approximately 6,000 square feet. Farmers living in close proximity organize into co-operatives and elect a supervisor to assist members in production and marketing. Action leading to approval or disapproval of a farm area ordinarily proceeds somewhat as follows. The request for approval is made by the co-operative to a Quartermaster Corps purchasing officer. After receipt, the request is forwarded to a veterinary inspector who travels to the area, performs an overall appraisal, and selects plots from which soil samples are collected for laboratory examination. Samples are collected from at least 20 per cent of the plots and from at least five points within each selected plot. Soil from the surface of an area of from 1 to 2 square feet is lightly scraped into a sterile wax paper lined paper bag with a sterile tongue depressor and transmitted to the 406th Medical General Laboratory where it is examined for human helminth ova and enteric bacteria. Sixty per cent of soil samples are required to be free from *Escherichia coli* and viable parasite ova. After inspection and laboratory examinations have been accomplished the inspector makes appropriate recommendations to the approving authority. If approval is given, a contract is made for the purchase of a quantity of vegetables, this quantity is based on a reasonable estimate of the production of the farms in the co-operative. Periodically during the term of the contract samples of a vendor's produce are drawn for laboratory examination. No more than 10 per cent of such samples can be contaminated by either *Esch. coli* or parasitic ova. This figure has never yet been reached.

The response of local producers to the program was excellent and the program progressed so successfully that by the end of the first growing season (fall of 1955) it was possible to obtain practically all needs of this theater for salad vegetables from local sources and at competitive prices. Since that time it has been required that all purchases be made from approved sources. In order to ensure an uninterrupted supply of tomatoes, cucumbers and green peppers at the start of the program those not obtainable from approved sources continued to be obtained under the warrant system. This authorization has been greatly reduced with a concomitant reduction in subsistence costs. One Quarter master Corps hydroponic farm has been scheduled for shutdown as a result of the success of the program. This farm had proved its value although it was an expensive source of vegetables. The program has also been well received by the military public. It was required however, that military facilities serving or selling locally procured food indicate these items on menus and placards.

#### FACTORS AFFECTING USE OF LOCALLY PROCURED PRODUCE

The Army Medical Service in the Far East was eager to increase the fresh components of the ration and to help in reducing ration costs by allowing the purchase of as many fresh vegetables and fruits as possible. However in recommending the use of local produce it had to consider that (1) there was a plethora of gastrointestinal infections in the Far East which possibly were associated with fresh vegetables and (2) the occurrence of such infections in American troops had been held to favorably low levels.

Many extensive surveys of the bacteriologic and parasitologic causes of intestinal diseases have been made in Japan particularly since 1945. These studies have been made by many groups of American investigators among troops and their dependents and among Japanese employees. Other special studies have been made on specific diseases in co operation with Japanese medical authorities. In addition the Japanese maintain extensive public health records which also include occurrence of gastro-intestinal diseases.

In table 1 data on the occurrence of ascariasis among the Japanese civilian population have been summarized for the years between 1930 and 1954. These data were obtained from Japanese public health records and include examinations of school children and government and industrial workers throughout Japan. There has been gradual improvement since 1946 but infection rates are still high by western standards.

TABLE I Occurrence of ascariasis in Japan between 1930 and 1954

Year	Persons examined	Percent positive
1930	516 986	50 6
1935	609 331	42 0
1940	593 759	37 2
1945	413 241	54 8
1946	821 765	67 2
1947	2 055 274	65 2
1948	3 334 597	62 9
1949	5 599 078	62 5
1950	7 220 649	59 6
1951	6 552 430	55 1
1952	6 191 607	48 3
1953	7 707,763	43 2
1954	8 019 238	38 0

Data from Japanese public health reports

Other Japanese reports show that diarrhea, enteritis, and "ulceration of the intestine" have been leading causes of death in Japan since 1900, the rate per 100,000 for that year being 130.7 for the group. In 1954 the rate was reduced to 38.9, however, in the years between 1920 and 1932 the rate was never lower than 200. No records were kept for the years 1943 through 1946, but the rates were undoubtedly high. Deaths from these causes ranked eighth in 1954, the rate being 38.9 per 100,000 population, or about the same as deaths from accidents (including motor vehicle accidents) which had a rate of 39. Gastroenteritis and colitis (except ulcerative colitis in children age four weeks and over) were the main causes of death in children one to four years of age in the period 1950 to 1954. During the same period, dysentery was the second principal cause of death in the same age group. Those reports give some indication of the problems experienced by the Japanese with intestinal diseases.

The U. S. Army's 406th Medical General Laboratory has conducted many studies on the incidence of helminthic and protozoan infections in the Japanese civilian population. A comprehensive report published in 1951<sup>4</sup> on representative population groups in all four main Japanese islands showed that ascariasis incidence was lowest (44 per cent) in the mountain areas of Hokkaido, and highest in the agricultural areas of Shikoku (91 per cent), Kyushu (92 per cent), Central Honshu (89 per cent), and Hokkaido (93 per cent). The same report noted that marked variations occurred in the incidence of amebiasis, with the lowest and highest indices occurring in Hokkaido (2.9 per cent and 26.2 per cent). The overall average for Japan in 1951 was estimated to be about 7.5 per

cent with cities having a lower rate than farm areas. Later this figure was revised upward to about 12 per cent.

By way of contrast there has apparently been little change in the occurrence of intestinal parasitic infections in American military personnel and their dependents in Japan since 1946. Data on 3 518 American personnel and 1 159 Japanese employees of U S Forces summarized in table 2 are representative and are useful in determining the basic levels of infection. Practically all of the Americans were dispensary patients from the Tokyo area and presumably had complaints possibly attributable to parasitic infections. The Japanese usually were young adults and assumed to be in good physical condition.

TABLE 2 Occurrence of parasitic infections in American military personnel and dependents and among civilian Japanese civil an personnel (Tokyo Japan, January to December 1954)

	Americans		Japanese	
	Number	Per cent	Number	Per cent
Persons examined	3 418		1 159	
Positive for parasites	751	22.0	649	56.0
Helminth infections	217	6.3	249	21.5
Ascaris lumbricoidea	91	2.7	231	19.9
Trichuris trichiura	60	1.8	68	5.9
Hookworm	12	0.4	169	14.6
Trichostrongylus sp.	36	1.1	4	0.3
Enterobius vermicularis	12	0.3	3	0.3
Strongyloides stercoralis	12	0.3	10	0.9
Others				
Protozoan infections	71	2.1	36	3.1
Entamoeba histolytica	149	4.4	120	10.4
Entamoeba coli	180	5.3	137	11.8
Endolimax nana	91	2.7	50	4.3
Giardia lamblia	29	0.8	3	0.3
Others (known nonpathogenic)				

From Personal Report 406th Medical General Laboratory 1954  
 Not included: a total number of infections because all patients prepared were not used in all instances.

A study of intestinal parasitism among 4 438 food handlers in the Third Army Area (including 925 soldiers with Korean service, 2 799 without Korean service, and 714 civilians) was reported in this Journal by Radke and associates. The summary of the report stated in part that "Military personnel who had Korean service showed a slightly higher incidence of helminth infections but the total of the agents recovered was higher from military personnel who had no Korean service."

The relationship of bacteria of the paracolobactrum group to intestinal disease has been studied extensively at the 406th Medical General Laboratory and published in this *Journal* in 1954 and 1955.<sup>1,2</sup> Whether the presence of these organisms on vegetables is indicative of human fecal contamination is not sufficiently understood, nor is their pathogenicity completely known. Feeding enteric organisms of doubtful pathogenic nature to human volunteers is the only acceptable method for determining pathogenicity. To our knowledge, such experiments with adults have not as yet been performed. Therefore, there is insufficient specific evidence available at this time to indicate the danger of these organisms to young, healthy adults in the military service. On the other hand, several strains of paracolobactrum were recovered from a large number of service personnel involved in several food poisoning outbreaks,<sup>3</sup> and the role of certain members of this group of bacteria in diarrheas and dysenteries in children is well established. For this reason considerable caution is still required in recommending open purchase of salad vegetables in the Far East.

It is evident from this brief analysis of medical data that the military medical services faced a serious problem, and it is obvious that it was necessary for them to move cautiously. Similarly, any reluctance to change an existing, although costly, system is readily understood.

#### CURRENT AND CONTEMPLATED LABORATORY STUDIES

In addition to the field and laboratory studies referred to in previous sections, implementation of the tri-service directive necessitated other laboratory studies that were in more direct support of the program. These studies have been conducted by the 406th Medical General Laboratory and have been directed along three lines. It was first necessary to establish suitable standards of acceptability for vegetable produce and, after this was accomplished, to provide a continuing program of examinations on produce obtained from approved contract sources. Lastly, studies were to be undertaken to devise better laboratory techniques, and to investigate more thoroughly the actual role of night-soil fertilization in the transmission of enteric organisms.

Bacteriologic and parasitologic examinations of soils were required as a part of the preliminary inspection of farms. *Esch. coli* and ova of *Ascaris lumbricoides* were used as the principal indicators of fecal contamination. Although the presence of these organisms will indicate only approximately when contamination occurred, the examinations provided a good index to the infection potential in the soil. Since it could be assumed that both organisms would probably be found in a proportion of any soil samples,

it was improbable that any large number of ideally acceptable farms would be found. Therefore it was necessary to establish certain minimum standards of acceptability. This was accomplished by an extensive study on soils and vegetables obtained from an Army operated farm and farms of vendors then supplying produce under warranty and vegetables imported from the United States. These standards which have been defined in a previous section are considered to be realistic and practicable. They have been used as a basis for issuance of contracts as well as to control the acceptability of produce offered by contractors after approval.

As soon as purchases of salad vegetables were started under the provisions of the directive a program was instituted in the departments of medical zoology and bacteriology whereby representative samples of vegetables were examined for parasitologic and bacteriologic contamination. Procedures which have been standardized and adapted for routine use were employed for both types of examinations.

The extent of either type of contamination on vegetables has not been great. Parasitologic findings from routine examinations made during the latter half of 1955 are summarized in table 3, and bacteriologic findings for the same period are presented in table 4. In addition to *Esch. coli* paracolobactrum were also used as

TABLE 3 Summary of parasitologic examinations on vegetables procured from approved local contractors 1955

V e g e t a b l e	S a m p l e		N u m b e r p o s i t i v e	O v e r a l l		P e r c e n t e m b r y o n e s	
	N u m b e r	P e r c e n t f i n a l		A c c e p t a b l e	T r a n s f e r r e d	A s c e n d a n t	T r a n s f e r r e d
L e t t u c e	530	19.5	11	33	0	18.2	0.0
C e l e r y	125	4.6	11	31	2	6.5	0.0
C a b b a g e	218	8.0	2	2	0	0.0	0.0
R o d i o	143	5.3	3	1	4	100.0	100.0
T m a t	305	11.2	2	7	3	0.0	0.0
C a r r o t	212	7.8	2	4	0	50.0	100.0
O n i o n	119	4.4	3	1	6	0.0	0.0
O r b e r s	1063	39.2	4	6	0	66.7	60.0
T o t a l	2715			38	85	17.6	60.0

From Parasitological Report 406th Medical General Laboratory 1955  
 Period monthly salad vegetables from approved local contractors  
 Two samples of rutabagas and two of potatoes

TABLE 4 Isolation of *Escherichia coli* and *Paracolobactrum coliforme* from vegetable and soil samples

Vegetable	Samples		Positive samples			
			Each coli		P coliforme	
	Number	Per cent of total	Number	Per cent	Number	Per cent*
Cabbage	244	12.3	9	3.7	20	8.3
Carrot	175	8.8	2	1.1	8	4.6
Celery	82	4.1	6	7.3	9	11.0
Lettuce	471	23.8	9	1.9	36	7.6
Parsley	140	7.1	16	11.4	22	15.7
Radish	128	6.5	5	3.9	9	7.0
Tomato	280	14.1	1	0.4	13	4.6
Cucumber	103	5.2	0		9	8.7
Onion	105	5.3	1	1.0	3	2.9
Pepper	105	5.3	0		5	4.8
Others	147	7.4	5	3.4	10	6.8
Total	1980		54	2.7	144	7.3
Soils	2396		156	6.5	65	2.7

From Professional Report 406th Medical General Laboratory 1955

\*\*Per cent of total number of specimens of a type

\* Principally salad vegetables few fruits and cooking vegetables represented

indicators of bacterial contamination. The vegetable most frequently contaminated with parasites was celery, 8.8 per cent of 125 samples contained ova of *A. lumbricoides* or *Trichuris trichiura*, while only 2.1 per cent of the lettuce samples were contaminated. Together these vegetables accounted for 5.8 per cent of the total number of parasitologically positive samples. Although the incidence of contamination with ova was high, the total number of ova found was relatively small. Only 15 ascaris and 9 trichuris eggs were actually involved.

*Esch. coli* was found in 2.7 per cent of vegetable specimens and *Paracolobactrum coliforme* in 7.3 per cent. Parsley was the principal offender, 11.4 per cent of the samples carried *Esch. coli* while *P. coliforme* was found in 15.7 per cent. The occurrence of the two bacteria on celery closely matched the relatively high rate of parasitologic contamination, rates for the bacteria being 7.3 per cent for *Esch. coli* and 11.0 per cent for *P. coliforme*.



Lettuce was infrequently contaminated with *Esch coli* (19 per cent) although the occurrence of *P coliforme* was fairly great (76 per cent)

Contamination on tomatoes, cucumbers, and green peppers was observed only infrequently. Because of this and the fact that they are easily washed, it is anticipated that these vegetables will be removed from the list of products that must be purchased from approved sources.

It should be noted that nearly all vegetables were received in "as delivered" condition; hence the extent of contamination was not necessarily indicative of what would be expected after the vegetables had been trimmed and prepared for serving. Interpretation of parasitologic examinations on vegetables was complicated by the fact that laboratory tests indicate that the examination procedure is only about 60 per cent reliable. Hence, it is possible that a comparatively high proportion of positive samples and ova might have been missed. However, the procedure is not selective for ova in particular stages of development.

Ova of ascaris and trichuris were found in 16.5 per cent of the routine soil samples examined during the last six months of 1955, while the rates for *Esch coli* and *P coliforme* were 6.5 and 2.7 per cent respectively. All samples were examined as a phase of the initial inspection of farms, and in some instances approval was not given because of evidence of excessive contamination.

It is recognized that these laboratory studies are essentially expedients and that information should be obtained on several additional points. A fundamental problem is to devise techniques or procedures whereby "recent" fecal contamination can be differentiated from contamination that might result from organisms already in the soil. This differentiation is important because the first type can be controlled but the latter cannot. For this reason, consideration is being given to the use of possibly shorter lived organisms such as enterococci as indicators. Also, the millipore filter technique as used by Stanetz and associates<sup>1</sup> for the recovery of micro-organisms may prove to be adaptable for soil and vegetable examinations, thus permitting the use of larger samples.

In view of observations such as those made in the United States by Rudolfs, Falk, and Ragotskie<sup>2</sup> and Wang and Dunlop<sup>3</sup>, it is evident that care must be taken not to impose excessively strict requirements on vegetable producers in areas such as Japan. These observations have suggested the desirability of comparing the occurrence of enteric bacteria and helminth ova in soils and vegetables in areas of Japan where different agricultural practices are followed. Such a study is in progress at the 406th Medical General Laboratory. The investigation has been expanded to per-

with a more comprehensive study of the role of vegetable produce in the epidemiology of dysentery and trichuriasis

### SUMMARY

Four of gastro intestinal infections among the United States Armed Forces and their dependents in the Far East has resulted in the past in elaborate precautions to avoid such diseases by empirical methods. By extending this concern to the matter of fresh vegetable procurement, the military prior to 1955 resorted to the costly expedient of obtaining its supply of these important foods from hydroponic farms and sources in the United States. Experience with a general food procurement program implemented in early 1955 has demonstrated that with well conceived and properly executed sanitary standards, it has been possible to develop in Japan and Okinawa a safe supply of salad vegetables on a scale sufficiently large to be practical and, equally important, to eliminate much unwarranted concern.

---

**ACKNOWLEDGMENT** Special acknowledgment is given to Lieutenant Colonel William Wyatt MSC USA, Colonel Benjamin F. Leach USAF (VC), Colonel Ralph Cleland MSC USA, Lieutenant Colonel Oscar Felsenfeld, MC USA, Captain Robert W. Babione MC USN, Lieutenant Richard Kaufman MSC USN and Lieutenant Henry E. Bloom MSC USN for participation in formulating the tri service directive and for support given to implementing the present food procurement program.

---

### REFERENCES

- 1 Toyoshima A. Personal communication
- 2 Rudolfs W, Falk L L and Ragotskie R A. Contamination of vegetables grown in polluted soil. *Sewage and Indust Wastes* 23: 992-1000 Aug 1951
- 3 *Procurement of Indigenous Food Products in Japan* Aug 20 1954. Published jointly by Headquarters U S Army Forces Far East (AFFE Circular No 145) Commander Naval Forces Far East (COMNAVFE Instruction No 4213 4) and Headquarters Far East Air Forces (FEAF Regulation No 160-32)
- 4 406th Medical General Laboratory U S Army. Parasitological studies in Far East: summary of common intestinal and blood parasites of the Japanese. *Japan Logistical Command Bull* No 4 p 51 1951
- 5 Radke M G, Thomas R C, Mrazek J F, Nibley C Jr and Aronson R S. Is Korean service a health hazard to civilian communities? *U S Armed Forces M J* 6: 794-798 June 1955
- 6 Eveland W C, Freeman N L, Felsenfeld O and Fase A. Study of *Paracolo bacterium coliforme* strains isolated in Far East. *U S Armed Forces M J* 5: 1683-1687 Nov 1954
- 7 Eveland, W C, Felsenfeld O, Babione R W, Kuhns O M and Kase A. Further studies of *Paracolo bacterium coliforme* strains in Far East. *U S Armed Forces M J* 6: 1605-1618 Nov 1955
- 8 Professional Report 406th Medical General Laboratory 1955. In Press
- 9 Slanetz L W, Oartley C H and Bent O F. Evaluation of membrane filters for the determination of numbers of coliforme and enterococci in water. *Bact Proceedings* 1954 General Meeting Pittsburgh Pa 1954
- 10 Wang W L L and Dunlop S G. Animal parasites in sewage and irrigation water. *Sewage and Indust Wastes* 26: 1020-1032 Aug 1954

# DYNAMIC FACTORS IN PSYCHIATRIC DISCHARGES OF MIDSHIPMEN

DEAN J PLAZAK Lieutenant MC USN

THE GOAL of the United States Naval Academy is to provide midshipmen with a basic education and knowledge of the naval profession and by tradition and example to indoctrinate them with the highest ideals of duty honor and loyalty for the purpose of providing the naval service with capable junior officers

Adjustment to the program devised to carry out this goal necessarily requires that each midshipman accept the challenge not only of pursuing a college education but also of making an abrupt change from civilian to military life The entire summer before the freshman academic year is set aside to help the new midshipman with this transition Personal counseling with regard to problems which seemingly arise out of this adjustment is provided by each midshipman's company or battalion officers throughout the four years

When persistent problems appear to stem from long standing personality disorders or from psychiatric illness outpatient psychiatric evaluation and treatment facilities are available in the Academy's medical department and inpatient care is available at the U S Naval Hospital in Bethesda Md

Assistance in attaining and maintaining a healthy adjustment to the new environment is also provided through mental hygiene and leadership courses conducted by the department of psychology This program additionally provides confidence and support for midshipmen contemplating and later accepting needed outpatient psychiatric help

Each year approximately one tenth of the total midshipman population is disenrolled Fifty per cent of these midshipmen are discharged by reason of academic failure 10 per cent for serious or repeated violations of regulations and 10 per cent by reason of physical or psychiatric disability 30 per cent resign for personal reasons Difficulty in personal adjustment to the academy appears to be an important factor in all of the

disenrollments even if only the general reasons just listed are considered

In the course of detailed clinical evaluations conducted on these midshipmen referred for inpatient psychiatric care in 1955, it became apparent that the dynamic determinants of their illnesses appeared to be closely related to their specific difficulty in personal adjustment to the setting of the Naval Academy. The ability to establish a successful masculine relationship with both peers and authority figures seemed to be the most important criterion of successful adjustment. Knowledge of the reasons for inadequate adjustment was recognized as potentially valuable in reducing the number of yearly disenrollments.

Complete clinical records of 44 midshipmen discharged from the Naval Academy from mid 1948 to mid 1955, by reason of emotional disorders, were available for this study. In each instance, these records contained a complete physical, laboratory, and mental examination, detailed psychometric testing, including Wechsler Bellevue and Rorschach tests, comprehensive interviews with parents or guardians obtained by trained social workers, and verbatim interviews with the patients. The academic, health, personal, and disciplinary records of all of these patients were obtained for study from the registrar of the Naval Academy.

### PRECIPITATING STRESSES

Symptoms of illness in these midshipmen appeared at seven specific times of stress during the four years. Thirty-two of the 44 patients required inpatient care after their initial difficulty at one of these times, 12 after 2 or more of these 7 periods of stress (fig. 1).

Ten of the 44 midshipmen experienced difficulty during freshman class or "plebe" summer. They found the academy far different from what they had expected, were homesick, or felt unprepared for the emphasis placed on teamwork and competition. These reactions represented ambivalence with regard to dependency needs and lack of individual self-confidence and self-esteem. Three of these 10 midshipmen required inpatient psychiatric care at this time.

The return of the upperclassmen in the fall of the freshman year was described by 20 of the 44 midshipmen as the major source of their difficulty. They felt unable to meet such demands as were made on their behavior and performance by the upperclassmen. They were introduced at this time to such traditional practices as performing errands and chores and answering numerous questions by rote for demanding upperclassmen. This appeared to arouse precariously controlled aggressive feelings toward

# DYNAMIC FACTORS IN PSYCHIATRIC DISCHARGES OF MIDSHIPMEN

DEAN J PLAZAK Lieutenant MC USN

**T**HE GOAL of the United States Naval Academy is to provide midshipmen with a basic education and knowledge of the naval profession and, by tradition and example, to indoctrinate them with the highest ideals of duty, honor, and loyalty, for the purpose of providing the naval service with capable junior officers

Adjustment to the program devised to carry out this goal necessarily requires that each midshipman accept the challenge not only of pursuing a college education but also of making an abrupt change from civilian to military life. The entire summer before the freshman academic year is set aside to help the new midshipman with this transition. Personal counseling with regard to problems which seemingly arise out of this adjustment is provided by each midshipman's company or battalion officers throughout the four years.

When persistent problems appear to stem from long standing personality disorders or from psychiatric illness, outpatient psychiatric evaluation and treatment facilities are available in the Academy's medical department and inpatient care is available at the U S Naval Hospital in Bethesda, Md.

Assistance in attaining and maintaining a healthy adjustment to the new environment is also provided through mental hygiene and leadership courses conducted by the department of psychology. This program additionally provides confidence and support for midshipmen contemplating and later accepting needed outpatient psychiatric help.

Each year approximately one tenth of the total midshipman population is disenrolled. Fifty per cent of these midshipmen are discharged by reason of academic failure, 10 per cent for serious or repeated violations of regulations and 10 per cent by reason of physical or psychiatric disability, 30 per cent resign for personal reasons. Difficulty in personal adjustment to the academy appears to be an important factor in all of the

---

From U S Naval Hospital, National Naval Medical Center, Bethesda, Md.

disonrollments even if only the general reasons just listed are considered

In the course of detailed clinical evaluations conducted on those midshipmen referred for inpatient psychiatric care in 1955, it became apparent that the dynamic determinants of their illnesses appeared to be closely related to their specific difficulty in personal adjustment to the setting of the Naval Academy. The ability to establish a successful masculine relationship with both peers and authority figures seemed to be the most important criterion of successful adjustment. Knowledge of the reasons for inadequate adjustment was recognized as potentially valuable in reducing the number of yearly disonrollments.

Complete clinical records of 44 midshipmen discharged from the Naval Academy from mid 1948 to mid 1955, by reason of emotional disorders, were available for this study. In each instance, these records contained a complete physical, laboratory, and mental examination, detailed psychometric testing, including Wechsler-Bellevue and Rorschach tests, comprehensive interviews with parents or guardians obtained by trained social workers, and verbatim interviews with the patients. The academic, health, personnel, and disciplinary records of all of these patients were obtained for study from the registrar of the Naval Academy.

### PRECIPITATING STRESSES

Symptoms of illness in these midshipmen appeared at seven specific times of stress during the four years. Thirty-two of the 44 patients required inpatient care after their initial difficulty at one of these times, 12 after 2 or more of these 7 periods of stress (fig. 1).

Ten of the 44 midshipmen experienced difficulty during freshman class or "plebe" summer. They found the academy far different from what they had expected, were homesick, or felt unprepared for the emphasis placed on teamwork and competition. These reactions represented ambivalence with regard to dependence needs and lack of individual self-confidence and self-esteem. Three of these 10 midshipmen required inpatient psychiatric care at this time.

The return of the upperclassmen in the fall of the freshman year was described by 20 of the 44 midshipmen as the major source of their difficulty. They felt unable to meet such demands as were made on their behavior and performance by the upperclassmen. They were introduced at this time to such traditional practices as performing errands and chores and answering numerous questions by rote for demanding upperclassmen. This appeared to arouse precariously controlled aggressive feelings toward

authority feelings of inadequacy under stress, and fear of attack. Sleepwalking was reactivated at this time in two patients who had experienced this difficulty in childhood. Ten of these 20 midshipmen required inpatient psychiatric care.

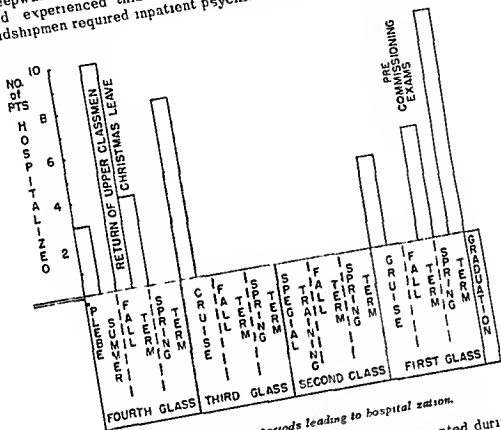


Figure 1 Specific stress periods leading to hospitalization.

A lack of desire to return from Christmas leave granted during the freshman year was expressed by 5 of the 44 patients. Their feelings appeared to be dynamically similar to those of the first two groups wherein a temporal opportunity was used to make their feelings more emphatic. Four of these men required inpatient psychiatric care at this time of stress.

The purpose of the two summer cruises taken prior to the sophomore and senior academic semesters is to train the midshipmen in the operational duties of watch and division officers and to assist them in adapting to the environment aboard ships at sea. Twelve of the 44 patients in this series appeared with various complaints in the psychiatric department at the academy prior to the sophomore class summer cruise. Eight required inpatient care. The remaining 4 of these 12 students appeared again before the senior class summer cruise and required inpatient care. They all appeared to be in panic over thoughts of the

relatively isolated confines of a ship and especially at the thought of leaving land. In addition, there were strong feelings of being unable to meet the responsibilities of an officer assigned a specific task which he must accomplish. The tasks that seemed to produce the most anxiety were those requiring individual judgment, such as directing a group of men in an assigned navigation problem. Irritability over having to sacrifice personal comfort, privacy, and desires because of the close relationships aboard ship was a problem to some of these 12 midshipmen.

The sixth stress period occurred at the time of the final physical and personal examination for commissioning, which takes place in the fall of the senior year, and the seventh in the two months prior to graduation. Fifteen of the 44 patients were admitted to the hospital at these times, most of them with physical complaints. Dynamically, these two groups displayed resistance to the assumption of the responsibilities of a commissioned naval officer. A substantial number used these opportunities to indicate their previously unexpressed personal desires for other life pursuits. Their attendance at the Naval Academy appeared to be an attempt to gain better relationships with paternal figures by accepting their fathers' goals as their own.

#### BEHAVIOR IN THE ACADEMY SETTING

Each of the 44 patients displayed an individualized response to the setting of the Naval Academy in terms of behavioristic difficulties. This was further reflected in the wide variety of diagnostic categories in which the patients were placed, varying from personality disorders to overt psychoses. However, their responses fitted into four major categories, with some types of behavior such as suicidal gestures and physical complaints common to all four. Lack of voluntary participation at the Academy in sports involving bodily contact was characteristic of all 44, and only 8 participated to any extent in team sports of non-contact type.

The four major categories of behavior responses to the Naval Academy setting have been designated as groups A, B, C, and D. The 12 patients in group A showed a behavior pattern characterized by passive resistance. They studied and met recitation standards, but did not pass examinations. Their disciplinary demerits were acquired by carelessness in personal appearance, tardiness in reporting for appointments, drill formations, and class formations, losing official papers and personal possessions, and having disorderly rooms. The performance of this group in intramural athletic competition was poor. Over half of the patients in group A complained frequently to the outpatient medical staff of headache, backache, and diffuse gastro intestinal upsets. Three of these 12 had over 5 hospital admissions for



complaints of this type before their psychiatric inpatient care began.

The 14 patients in group B displayed behavior which was aggressively resistant. Academically, they did not prepare assignments, did not meet recitation standards, and made little effort to pass examinations. They frequently gave "I don't know" as a recitation answer. These patients did not do well in their personal relationships with other midshipmen and were especially antagonistic to upperclassmen. Their demerits were acquired by failure to keep good military discipline, open disregard for rules, improper performance or neglect of assigned duties, and disorderly conduct in ranks of an attention getting nature. This group repeatedly attempted to submit resignations which were not accepted because parents or guardians would not consent. Such consent is necessary if the midshipman is under 21 years of age.

The six patients in group C openly questioned and challenged authority in the academic classes and in military and athletic activities. They were demanding of special attention and attempted to lure those in authority into long argumentative discussions. This group insisted that the regulations of the Naval Academy were at fault and were designed to irritate them personally and acquired their disciplinary demerits for unwarranted assumption of authority, unauthorized absence, and disrupting and disorderly conduct.

The 14 patients in group D made a concerted effort to appear to conform and behaved in a withdrawn, seclusive, ruminative fashion. They displayed little or no initiative, avoided responsibility, and assumption of authority, and would perform assignments in a slow but satisfactory manner only if it were mandatory. They were academically borderline, gradually falling into the "nonpass" category. Their disciplinary difficulties were caused by progressive deterioration of personal appearance and awkwardness in military and athletic groups.

A further means of objectively evaluating and categorizing dynamically significant behavior was provided by the aptitude for service\* system. This is a system designed to determine on a comparative basis within each class a midshipman's ranking in attitude, performance of duty, leadership, and military bearing. Rankings are made by fellow class members, upperclassmen, and staff members. The aggressively resistant patients in group B were consistently ranked low in military bearing, the "challengers" in group C low in service aptitude, the withdrawn patients in group D low in leadership. Most of the patients in all four groups ranked medium in all the other ratings. The difficulty in ranking patients from group A experienced by both

poors and authority figures, indicates the varying success of passive resistant behavior

### FATHER SON RELATIONSHIPS

Objective and subjective evaluations of the patients' relationships with their fathers were made in each of the 44 cases

Objective evaluation revealed that the father was deceased in 6 of the 44 cases, and in 4 instances had been replaced by a stepfather who was rejecting or withdrawn. In 4 of the 44 cases the parents were divorced, the child's custody awarded to the mother, and subsequent contact with the father either nonexistent or unfavorably looked on. In the remaining 34 intact homes, 16 of the fathers appeared to be dominant, rigid, unapproachable, difficult to please, and excessively demanding, 10 had a serious problem with excessive use of alcohol, 4 were unsettled in occupations or were drifters or unemployed, 3 were absent from the home most of the time by choice, and 1 was passive, unresponsive, and withdrawn.

Subjectively, 18 of the 44 patients complained of their fathers as difficult to get to know and to get along with, 14 were fearful of their fathers, 4 reported they had no father, 2 showed open dislike for their fathers, 2 knew other men they would have preferred as fathers, 2 described their fathers as chronically ill, and 2 expressed no opinion.

### MOTIVATION FOR ENROLLMENT AT THE NAVAL ACADEMY

In objectively determining individual motivation for coming to the academy, a notable lack of personal desire was found. It appeared that no midshipman in this study enrolled because of his own wishes but rather to meet one or more specific personality needs of others. Twenty six could not have been supported in college on a paying basis by their families, often because of poor financial planning. Twenty four enrollments were obviously used as a means of raising family prestige or social standing. Twenty two enrollments were desired by the father of the family, 10 ostensibly because the son "needed to learn discipline." In each of these 10 cases there was a history of a disciplinary problem at home, in school, or during a previous enrollment in a military school. This data again stresses the important role of identification with the father involved in the behavior of these patients, as well as the difficulty that many would experience in voluntarily resigning from the Naval Academy because of family and community repercussions.

### INTERRELATIONSHIPS AND DISCUSSION

The four groups of behavior responses to the Naval Academy setting, A, B, C, and D, and certain types of father son relation

ships were found to be significantly related. A father-son relationship was considered significant if it applied to 75 per cent of a behavior group. Patients in group A, characterized by passive resistant behavior, were fearful of or showed covert hostility to their fathers, and the fathers were dominant, rigid, unapproachable, demanding, and difficult to please. Dynamically, this group of patients had devised a passive means of expressing dissatisfaction that still allowed a never ceasing effort to try to obtain a much desired relationship, but bypassed the impossibility of a direct approach. Members of group B showed aggressively resistant behavior at the Academy, complained of fathers who were difficult to know and to relate with, or were openly hostile to their fathers, and the fathers were divorced, separated, absent frequently by choice, unemployed, or drifters. This group was much more openly expressive of the dissatisfaction felt toward an inadequate father and at the same time identified by behaving in the same "rule breaking" fashion.

Group C, who were openly questioning and demanding of authority, said they had no father or complained of a difficult relationship. Those fathers were deceased, some later replaced by stepfathers who were rejecting or withdrawn. These patients aggressively expressed their ambivalence over being forced to accept the paternal role in their families and over a continued need to be cared for as the son. Group D, the quiet withdrawn conforming patients, reported their fathers were sick or denied a difficult relationship. These fathers were objectively considered to have serious problems with excessive use of alcohol. This group displayed identifying behavior of a passive dependent quality and reflected the feelings of inadequacy and lack of self confidence of their fathers.

The patients in all four groups continued to relate to the setting of the Naval Academy as they previously did to their fathers. This was reflected in their specific disciplinary and academic difficulties. An insecure father-son relationship appears to predispose difficulty in adjusting to situations requiring further relationships with male peers and authority figures.

The appearance of suicidal gestures, physical complaints, and other examples of acting out behavior as initial symptoms of difficulty emphasizes the feeling that all these patients did not have a good enough relationship with any male authority to be based upon their experiences at home. The fear of failing in the eyes of their peers, families, and home communities was strong. The expression of physical or even serious emotional sickness as represented by a suicidal attempt seemed a more acceptable way out of an intolerable situation for these 44 patients than facing it directly.

The general lack of participation in group or body contact sports reflects the lack of desire for and inexperience in competition due to feelings of inadequacy and marked emotional investment in difficult family relationships.

Twenty seven of these patients were failing academically on admission to the hospital. All had intelligence levels of bright normal or above. This finding illustrates the well known interference with intellectual activity by emotional difficulties.

### CONCLUSIONS AND SUMMARY

Forty four clinical records of midshipman patients discharged from the United States Naval Academy for psychiatric reasons were studied to determine what significant dynamic factors led to their need for inpatient care.

Precipitating stresses in their illnesses were found to occur at seven specific times, dynamically related to feelings of dependency, repressed hostility, lack of good verbal communication with male parents, feelings of inadequacy with regard to responsibility and leadership tasks, and competition with peers.

Behavior patterns used in adjusting to the environment of the Naval Academy during the four years were found to fall into four general categories and to be closely interrelated with previous unsatisfactory father-son relationships. Dynamically, these techniques represented expressions of dissatisfaction with those relationships, and covert wishes to improve or change them.

Acting out rather than verbalization of feelings was characteristic of all of the patients. Presenting symptoms such as physical complaints were often related to an anticipated loss of respect by family, community, and peers in the event that they should request to resign from the Naval Academy.

Reasons for entrance into the Academy were usually found to be unrelated to the patient's personal desires, and met one or more specific personality needs of others, usually their fathers'.

Data of this type are recognized as potentially useful in screening Naval Academy applicants and in reducing the 10 per cent of the total midshipman population that is disenrolled each year for various reasons. The disciplinary and academic difficulties experienced by midshipmen discharged for psychiatric reasons are very similar to those experienced by midshipmen disenrolled for academic and disciplinary reasons.

Further exploration of the data evolved from these case studies appears to be indicated. Recognized factors not discussed in this article are previous community and peer relationships, attitudes and behavior of other midshipmen toward those having

difficulty in adjusting and resistance to early acceptance of need for psychiatric help. A long term statistical and dynamic study of all members of an entire class now in progress at the Naval Academy should provide valuable and needed control data for this case material not practical in the present study

---

### PHYSICIAN AND DISASTER

Plans must be made for proper reception and registration of casualties for skillful and rapid diagnosis of injuries for the utilization of recognized procedures and for the formation of teams of skilled auxiliary workers. To assure themselves of having an opportunity to render good medical service during a disaster and its aftermath physicians must take the lead in making certain that similarly careful planning has been done in the related fields of rescue communication transportation and fire and police work. Thus two distinct obligations face the physicians acquisition of recognized techniques for the handling of medical emergencies and stimulation of training of auxiliary workers. Men and women in related health fields are eager for the leadership which only the medical profession can give.

—HAROLD C. LUEYH, M. D.  
in *Journal of Iowa State Medical Society*  
p. 145 Mar. 1956

## Vivax Malaria Without Primary Attack in Korean Veterans

RICHARD S. HOMER *Captain, USAF (MC)*

THE conclusion that malaria never became a problem during the Korean campaign because of the routine use of chloroquine prophylaxis by the U S armed services has been supported by many investigators.<sup>1-4</sup> Malaria did become a problem, however, when the drug was discontinued and the troops returned to the United States.<sup>1-3</sup> The many and varied symptoms, plus a usual paucity of or often misleading physical findings, causes difficulty in making the diagnosis, as was well illustrated by Hall.<sup>5</sup>

Beginning December 1951, personnel of the U S armed services were given primaquine (15 mg base) daily for 14 days on the return trip from Korea.<sup>6</sup> This was done in an attempt to combat both the known tendency of Korean vivax malaria to recur after a latent period of 9 to 10 months and the known failure of suppressive chloroquine therapy to protect Korean veterans from relapse. This program has been effective but there have been cases of relapse reported despite the routine use of primaquine.<sup>7</sup>

The most important of the conclusions reached in previous studies were that (1) relapse of Korean vivax malaria may occur in the absence of an earlier primary attack, despite primaquine prophylaxis, and after the Korean veteran returns to the United States, and (2) it is difficult to establish the diagnosis, especially for medical officers not acquainted with the disease, because of the often misleading history and physical findings.

### CASE REPORT

A 21 year old Negro soldier was admitted to this hospital 2 August 1955 complaining of frontal headache, malaise, and sore throat of one day's duration. Onset was sudden and by the day of admission he was febrile but repeatedly denied having chills. Past history was significant in that he was stationed in Korea from February 1954 until January 1955 during which time he had no illnesses. He stated that he took the prescribed chloroquine in Korea and primaquine on the return trip to the United States.

---

From U S Air Force Hospital Beal Air Force Base Calif. Or Homer will be at Veterans Administration Hospital 5901 East Seventh Street Long Beach 4 Calif after 1 April 1957.

### Physical Examination

Physical examination revealed an acutely ill toxic man. His temperature was 101°F pulse 100 and blood pressure 122/75 mm Hg. Ear canals and drums were inflamed. The throat was markedly injected and the tonsils were enlarged and red but had no exudate. There was cervical axillary and epitrochlear lymphadenopathy. Heart and lungs were normal. Liver and spleen could not be palpated although there was moderate punch tenderness over the liver.

### Laboratory Studies

Complete blood cell count, urinalysis and a roentgenogram of the chest were within normal limits. A cardiolipin test was negative. No bile was found in the urine and urobilinogen was in normal concentration. Febrile agglutinins, heterophile antibodies, Weil-Felix agglutinations, van den Bergh reaction, cephalin-cholesterol flocculation test, stool examinations and roentgenograms of the gallbladder were within normal limits.

### Course in Hospital

For the first six days in the hospital the patient ran an intermittent spiking fever up to 105°F associated with extremely severe headaches. During this period he showed no response to large amounts of penicillin and chlortetracycline hydrochloride (aureomycin). Examination of the temperature curve on the fifth hospital day revealed that the temperature spikes came at 48-hour intervals with afebrile and asymptomatic periods between the spikes. During an afebrile period on the fifth hospital day trophozoites of *Plasmodium vivax* were found on a thin blood smear. More mature forms were found during a temperature spike the next day. The patient was then begun on the standard treatment of 1 gram of chloroquine immediately followed by 0.5 gram of chloroquine six hours later and then 0.5 gram per day for the next two days. Fifteen milligrams of primaquine base per day was begun with the chloroquine and maintained for 14 days. The patient showed no immediate response and became afebrile and asymptomatic. The liver tenderness persisted after he became afebrile but subsided by the end of the 14 days of therapy. He was discharged at the end of therapy and continued to be well on subsequent follow-up visits.

### DISCUSSION

Two other cases seen at this hospital and an additional case admitted to the 2473d USAF Dispensary were similar to this one in that there was no history of a previous attack of clinical malaria. This corresponds to findings of other studies.<sup>3,4,10</sup> In all four cases the "initial" attacks appeared in August or early September at least four months after the men left Korea. This corresponds to a latency period of 9 to 10 months inasmuch as the period of infectivity of Korean *vivax* malaria is between April and October.<sup>3,4</sup> It would seem that although the initial infestation

occurred in Korea, either the prophylactic chloroquine taken there prevented the appearance of clinical malaria,<sup>4</sup> or as is sometimes seen in untreated Korean vivax malaria, a primary attack never occurred.<sup>4,9,10</sup>

It is well known that chloroquine, even in therapeutic doses, will affect only the erythrocytic phase of malaria, and thus will not prevent relapses. Controlled studies of primaquine were reported to demonstrate that at doses of 15 mg of the base daily for 14 days, relapse of Korean vivax malaria would be prevented in 99 per cent of cases.<sup>7,8</sup> Use of this regimen for returning Korean veterans has decreased the rate of relapse, but the four cases described here support the observation of Hinson, Clove, and Pruitt<sup>7</sup> that occasional relapses do occur despite primaquine prophylaxis. In all fairness, it must be added that the only evidence that primaquine prophylaxis was taken in these four cases, is the statements of the patients themselves.

These cases illustrated both the difficulty of making a diagnosis of malaria when one does not suspect it, and the ease of diagnosis once the suspicion of malaria is aroused. Two cases were unusual in that chills were never experienced by the patients, nor seen by an observer. The most impressive features were the high fever and severe headache. Fever, stiff neck, and severe headache in one patient resembled encephalitis or meningitis, however, spinal fluid studies were within normal limits. All patients complained of malaise, anorexia, and in general presented a "flu like" picture. One patient complained of sore throat, two had nasal congestion, and three had pharyngeal lymphoid hyperplasia. Only one patient had a history of chills and fever every 48 hours, and fortunately the private physician who saw him initially had once practiced in an endemic malaria area of California and was familiar with the disease.

Splenomegaly was absent in all four cases, although it was present in 28 per cent of Hall's<sup>1</sup> series, and in the case recently reported by Rogers.<sup>5</sup> Hepatomegaly was not present but two patients did have punch tenderness over the liver. As in Hall's<sup>1</sup> series, many of the other physical findings were misleading, and often suggestive of diseases other than malaria.

None of the four patients had anemia, but one did have leukocytosis. In all patients, the cardiolipin test for syphilis was negative. As in Hall's<sup>1</sup> series the diagnosis of malaria was made with thin blood smears using Wright's stain. It is generally accepted, however, that the probability of making a correct diagnosis is increased when thick blood smears are used.

All four patients showed immediate response to the chloroquine-primaquine therapy as did the previously<sup>11</sup> cases. There was no evidence of primaquine toxicity in the Negro or Caucasian patients.<sup>11,12</sup>



In as many as 50 per cent of the cases reported by Hall, 14 diseases other than malaria were listed as the admitting diagnosis. Besides the causes for error in diagnosis discussed here and in Hall's article another important factor delaying diagnosis of malaria is a physician's lack of experience with the disease. These were the first cases of malaria seen by me and the other physicians who saw these patients initially. As was illustrated by these cases it is not safe to rule out the possibility of malaria because of previous prophylactic administration of chloroquine and primaquine.

### CONCLUSIONS

"A high index of suspicion for malaria is warranted in returning veterans with febrile illnesses in order to establish correct diagnoses." This "high index of suspicion" should be maintained despite the prophylactic use of chloroquine and primaquine. The warning should be heeded not only by military physicians but also by civilian physicians because many of the men returning from endemic malaria areas may have returned to civilian life before a relapse of malaria occurs.

### REFERENCES

- 1 Coggshall L. T. Malaria. In Harshbarger T. R. and others (editors) *Principles of Internal Medicine* 2d ed. C. C. Blakiston Co. Inc. New York N. Y. 1954, pp. 1139-1144.
- 2 Aquilino J. T. and Parelli J. A. Malaria in the United States: a review of clinical observations. *J. A. M. A.* 149: 834-838, June 28, 1952.
- 3 Hill L. A. Korea versus malaria: a critical analysis. 1953. *U. S. Armed Forces M. J.* 6, 20-34, Jan. 1955.
- 4 Hankey D. D., Jones R. Jr., Courtney G. R., Alving A. S., Cook W. G., Garrison P. L., and Dooley W. N. Korean malaria: a natural history and report to the equine. *Am. J. Trop. Med.* 2: 958-969, No. 1953.
- 5 Rogers F. B. Vietnamese malaria in the United States. *U. S. Armed Forces M. J.* 5: 1657-1660, No. 1955.
- 6 Alving A. S., Arnold J. D., Roberts D. H. Status of primaquine in the prophylaxis of subclinical versus malaria with primaquine. (Report to the Council on Pharmacy and Chemistry) *J. A. M. A.* 149: 1558-1562, Aug. 23, 1952.
- 7 Hume J. E., Cleaveland E. A., and Purcell F. W. Risks of severe malaria treated with primaquine and procaine. *Am. J. M. Sc.* 227: 9-12, Jan. 1954.
- 8 Garrison P. L., Cook W. G., Jurens B., Courtney G. R., Alving A. S., and Jones R. Jr. Status of primaquine cure of Korean versus malaria with primaquine. (Report to the Council on Pharmacy and Chemistry) *J. A. M. A.* 149: 1562-1563, Aug. 23, 1952.
- 9 Eddlema E. E., Jr., Hill W. H., and Saward W. M. Vietnamese malaria with long incubation period: report of 7 cases. *U. S. Armed Forces M. J.* 7: 1693-1698, Nov. 1951.
- 10 Arnold J. Alving A. S., Hockwald R. S., Clayman C. B., Dorn, R. J., and Butler E. Natural history of Korean malaria after delivery of the human infant. *J. Lab. & Clin. Med.* 44: 723-726, Nov. 1954.
- 11 Clayman C. B., Hockwald R. S., Edgemoor J. H., and Alving A. S. Status of primaquine in the cure of primaquine-resistant malaria. (Report to the Council on Pharmacy and Chemistry) *J. A. M. A.* 149: 1563-1568, Aug. 23, 1952.
- 12 Hockwald R. S., Arnold J., Clayman C. B., and Alving A. S. Status of primaquine in the cure of primaquine-resistant malaria. (Report to the Council on Pharmacy and Chemistry) *J. A. M. A.* 149: 1568-1570, Aug. 23, 1952.

# Tumors of the Testis in Infants

EVAN L. LEWIS *Lieutenant Colonel, MC USA*

MUCH has been written in the past 10 years on tumors of the testis, but from the literature one would think that the incidence of this disease in infants is rare. One of the most recent articles on the subject is that of Doyle,<sup>1</sup> who gathered 25 cases and added one of his own. In the past three years, three patients less than three years of age were admitted to this hospital with tumors of the testis. One of these tumors turned out to be a fibrosarcoma of the tunica albuginea, and the other two were undifferentiated adenocarcinoma (embryonal carcinoma). During this same period 17 adults were admitted with tumor of the testis. This suggests that the actual incidence in children is higher than we have previously believed.

Tumors of the testis may arise from any of the elements that comprise this organ. This includes tumors of connective and vascular tissue, as well as tumors of germ cell origin. Friedman and Moore<sup>2</sup> found 35 per cent of 922 tumors of the testis to be teratocarcinomas, 7 per cent were teratomas, 19 per cent embryonal carcinomas, 35 per cent seminomas, 1 per cent interstitial cell tumors, and 3 per cent rare or unclassifiable varieties.

As for tumors of germ cell origin, the generally accepted theory today is that they are all derived from a totipotent cell.<sup>3-5</sup> If this totipotent cell does not undergo differentiation, the seminoma is formed. Moore<sup>6</sup> and Friedman and Moore<sup>7</sup> preferred to call this tumor germinoma for that reason. With differentiation the tumor may go into one of two directions. It may form all three germ layers, in which case a teratoid tumor is formed, either immature (teratocarcinoma) or mature (teratoma). When this differentiation is not complete, an embryonal type of tumor is formed. This tumor is composed of primitive ectodermal tissue and may form a papillary adenocarcinoma, an undifferentiated adenocarcinoma, or an undifferentiated carcinoma with no attempt at glandular formation. The difference between this type of tumor of primitive ectoderm and the more vicious cytotrophoblast, which is principally trophoblast, is very small from the histologic standpoint in that the cells are similar and both arise from the same

---

From Tokyo Army Hospital Tokyo Japan. Col. Lewis is now assigned to Army Hospital San Francisco Calif.

ectodermal anlage. To the clinician, though, there is a considerable difference in survival rate, in rapidity of tumor growth and in mode and rate of metastasis.

Trophoblastoma is a differentiated cell similar to the Langhans cell of the chorion. It develops from primitive ectoderm. This cell metastasizes early and usually via the blood stream rather than by the lymphatics. If there are syncytial cells along with the trophoblastoma, then the tumor comes under the classification of syncytiotrophoblastoma, also termed chorioepithelioma.

Moore<sup>5</sup> suggested that the last three groups, namely, embryonal carcinoma, cytotrophoblastoma and syncytiotrophoblastoma, be lumped together. Yet there is enough difference in survival rates (65 per cent for embryonal, 16 per cent for the trophoblastomas) to make the differentiation.

The classification of an individual tumor is often not clear inasmuch as a given tumor may contain any one of the four major elements. A 7½ pound intra-abdominal tumor removed here was 75 per cent seminoma, but the other 25 per cent was made up of primitive ectodermal, trophoblastic, teratomatous and syncytial tissues.

It is now the practice to classify any given tumor according to the most malignant cell present according to the following scale, which begins with the least malignant and progresses to the most malignant: seminoma, primitive ectoderm, immature teratoid tissue, trophoblastoma and trophoblastoma with syncytium.

Table 1 shows the results obtained in the Walter Reed series (1942-1945)<sup>2, 4</sup> and with the above named classification gives some indication of prognosis and treatment.

TABLE 1

Type of tumor	5-year survival (per cent)	Average radiosensitivity (roentgen units)	Recommended tumor dose for maximum treatment (roentgen units)
Seminoma	85	800-1,500	2,000
Undifferentiated carcinoma	65	3,000-4,000	4,000
Teratocarcinoma	50	3,500-5,000	4,000
Trophoblastoma	16	4,000 plus	4,000

### CASE REPORTS

Case 1. A two-year-old white boy was transferred to this hospital 17 May 1954. Past history revealed that he had been operated on when seven days old for pyloric stenosis. Three months prior to admission

a plastic repair of the abdominal scar was done. Approximately two weeks prior to admission the parents noted an enlargement of the left testis. On 14 May 1954 the left testis was removed through an inguinal incision. On histologic examination the tumor was malignant type undetermined.

On admission to this hospital the inguinal sutures were in place without evidence of reaction. Physical examination revealed no other abnormalities. A roentgenogram of the chest was normal. Hemogram was normal and a urinalysis was negative. On 18 May 1954 a left radical retroperitoneal lymph node resection was carried out. There was no evidence of metastatic cells in the nodes. The final pathology report stated that the tumor was a fibrosarcoma of the tunica albuginea (fig. 1) which had replaced more than 60 per cent of the normal testicular tissue. No x-ray therapy was given and the patient was discharged two weeks postoperatively.



Figure 1 (case 1) *Fibrosarcoma of tunica albuginea*. Note typical fairly uniform pattern ( $\times 110$ )

On 22 October he was readmitted to this hospital because of the recent development of a pea sized lump in the left side of the scrotum. This lump was smooth in outline, firm, movable, and nontender. General physical examination and a roentgenogram of the chest were negative. On 26 October 1954 this scrotal mass was removed with considerable

surrounding tissue. The tumor was similar microscopically to the original tumor. Follow up at 18 months was negative.

**Case 2.** While having his two year old son treated in the outpatient dispensary for a laceration the father mentioned a swelling of the child's scrotum which had been present for from 2 to 3 months. The physician examined the child and advised immediate admission. The general physical examination revealed no abnormalities. The right testis was normal. The left testis was firm, irregular and measured 4 by 6 cm. It was not attached to the scrotal wall and the cord felt normal. A roentgenogram of the chest and an intravenous urogram were normal. A hemogram was normal and a urinalysis was negative.

The next day an orchiectomy was performed through an inguinal incision. Because the pathologist reported an undifferentiated adenocarcinoma (embryonal carcinoma) of the testicle (figs 2 and 3) a radical

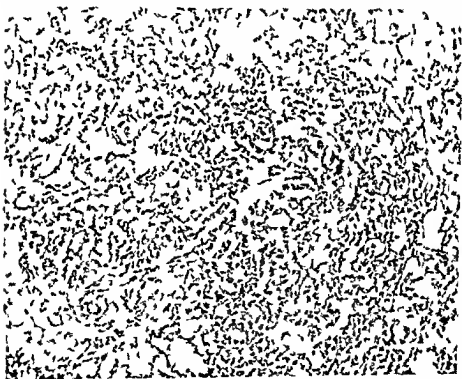
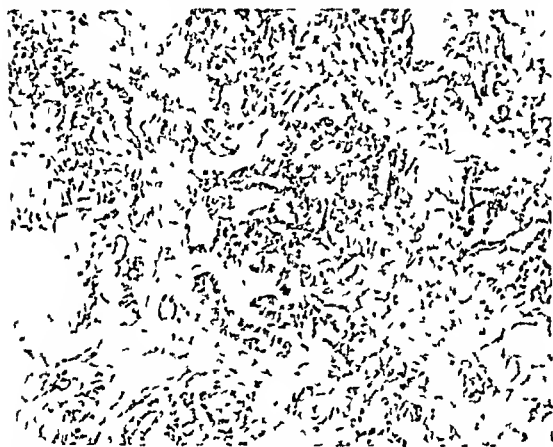


Figure 2 (case 2) Undifferentiated adenocarcinoma (embryonal carcinoma). Cells of primitive ectoderm arranged in an undifferentiated pattern. Central area shows early attempt at pseudoglandula formation. (X 110)

retroperitoneal lymph node resection was carried out on the left side 2 August. All nodes were stripped to the diaphragm. Inasmuch as there was no evidence of metastases it was decided not to give this child postoperative irradiation. One year after surgery he was gaining weight normally, he appeared normal on physical examination and a roentgenogram of his chest revealed normal findings.

**Case 3** An 8 month-old white male infant was first seen 18 January 1956 because of a firm swelling of the left testis. The diagnosis of hydrocele was considered, and an attempt was made to aspirate the sac. This was unsuccessful and the parents were told by the local physician that operation was necessary. On 22 January the patient was admitted to an Army hospital. The physical examination on admission was negative except for a large 3 by 4 cm left testis which was firm and of regular consistency. The skin was erythematous at the site of the aspiration. The cord was not thickened and felt normal. A hemogram was normal and a urinalysis was negative. A roentgenogram of the chest revealed normal findings.



*Figure 3 (case 2) Undifferentiated adenocarcinoma. Another section showing more advanced glandular formation. This supports the diagnosis of undifferentiated adenocarcinoma ( $\times 110$ )*

On 24 January the left testis was removed through an inguinal incision. The pathologist considered the tumor an undifferentiated adenocarcinoma (embryonal carcinoma) (figs 4 and 5). There was no evidence of spread up the cord and the tunica albuginea was intact. The patient was transferred to this hospital and on 2 February a left radical retroperitoneal lymph node resection was done. All remaining tissue in the left the scrotum was completely removed because an attempt to aspirate this tumor. All the nodes were negative. The patient made an uneventful convalescence and on 14 February. Because the nodes were not invol

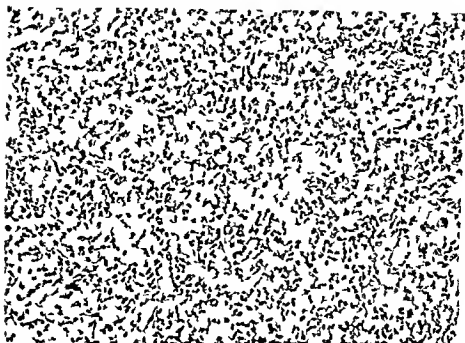


Figure 4 (case 3) Completely undifferentiated pattern of primitive ectoderm in an undifferentiated adenocarcinoma (embryonal carcinoma) ( $\times 110$ )



Figure 5 (case 3) Primitive ectodermal cells surrounded by immature mesenchyme arranged in early acinar pattern. Undifferentiated adenocarcinoma ( $\times 110$ )

creasing opportunities for exposures to the aniline derivatives. Cross sensitizations among local anesthetics have been studied for many years and have recently been reviewed by a number of authors (Rothman, Orland, and Flesch<sup>3</sup>, Struss<sup>4</sup>, Baer and Meltzer<sup>5</sup>).

Within this relatively small group of related compounds several types of cross sensitizations that vary greatly in the width of the sensitization spectrum and are based on different mechanisms have been reported. The chemical groups on which the cross sensitizations were based are the following: (a) aniline (Goodman<sup>6</sup>), (b) an OH group in the para or meta position on the aminobenzene ring (Schwarzchild<sup>7</sup>), (c) a tertiary amine (James<sup>10</sup>), (d) benzoic acid with a tertiary amine in the side chain (Waldron<sup>11</sup>), (e) esters of para aminobenzoic acid with secondary or tertiary amines in the side chains (Rothman, Orland, and Flesch), and (f) alkyl esters of para aminobenzoic acid (Laden and Rubin<sup>12</sup>).

Studies by Phillips<sup>13</sup> on cross sensitizations among certain local anesthetics and sulfonamide drugs revealed that, among subjects suffering from dermatitis due to various sulfonamide drugs, 68 per cent reacted to cutaneous tests with sulfanilamide, 30 per cent reacted to sulfapyridine, 21 per cent to sulfathiazole, 11 per cent to sulfaguanidine, and 7 per cent to sulfadiazine, while 16 per cent reacted to procaine hydrochloride. This shows that in a group of subjects hypersensitive to sulfonamide drugs the incidence of hypersensitivity to procaine hydrochloride is greater than to sulfaguanidine and sulfadiazine. Sulzberger and associates<sup>14</sup> observed cross sensitization to para aminobenzoic acid in two of eight subjects with dermatitis due to sulfonamide drugs, and one of these subjects also reacted to procaine hydrochloride.

The cross sensitization among paraphenylenediamine and azo-dyes are of practical importance because of the not infrequent occurrence of dermatitis due to azo-dyes in nylon stockings, with cross sensitization to paraphenylenediamine as described by Dobkevitch and Baer<sup>15</sup>. This reaction is based on the fact that both substances undergo transformations in the skin which lead to the formation of the same intermediate products. Baer, Leider, and Mayer<sup>16</sup> were able to show that this type of cross sensitization probably also extends to some of the azo-dyes which in the United States are certified for use in foods, drugs, and cosmetics. The cross sensitization among certified azo-dyes, aminobenzoic acid, quinones, and paraphenylenediamine is of decided importance clinically but has not been adequately investigated, although an investigation is being pursued by the same workers.

The term "cross sensitization" as employed here refers to the phenomenon in which a given sensitization crosses over among



# Cross Sensitization in Eczematous Contact Dermatitis

WILLIAM J. WAGNER *Lieutenant, MC USNR*

**T**HE PROPENSITIES for cross sensitization in allergic eczematous contact dermatitis have been considered by many investigators. Among the original studies of allergic sensitizations were those by Jadassohn<sup>1</sup> on reactions due to topically applied medicaments. Routine and systematic search for allergenic topical medicaments as causal or contributory factors in allergic contact dermatitis and other eruptions was first suggested by Goodman and Sulzberger.<sup>2</sup> These investigators proposed that patients who on the basis of clinical evidence were suspected of having developed allergic hypersensitivity to one or more topical medicaments be subjected to patch tests with a therapeutic tray and a standard series of commonly used topical medicaments. This procedure helps to ascertain with a considerable degree of accuracy any existing allergic sensitizations to these topical agents. The systematic elimination of those topical medicaments that are almost certain to cause aggravation and often also spreading of an existing dermatosis has proved itself to be of the greatest practical importance. One must, however, be aware of the fact that these tests cannot prevent or forecast subsequent development of allergic sensitizations to other topical medicaments.

Bloch's<sup>3</sup> classical study in 1911 on the nature of iodoform hypersensitivity showed that certain cases of multiple sensitizations which might have been classified as polyvalents although specific actually represented cross sensitizations among a number of chemically and hence immunologically related compounds. Moreover his study explained the previously puzzling fact that some patients experienced specific allergic sensitizations to agents which they had never previously encountered.

Cross sensitization has been investigated frequently since Bloch's work as discussed by Sulzberger. Studies on cross sensitizations among a group of compounds containing aromatic amines as part of their molecule are by no means new, but are of renewed interest at the present time because of the ever in-

sediment revealed numerous red blood cells and 6 to 8 pus cells per high power field

On 12 January most of his flank pain had subsided and an intravenous pyelogram was normal with no evidence of a calculus. It was presumed the calculus had passed.

After surgical consultation the patient was transferred to the surgical service for repair of the inguinal hernios. On 10 February a left inguinal hernioplasty was performed under spinal anesthesia, using Pontocaine (brand of tetracaine hydrochloride). On 12 February the patient was noted to have an acute vesicular eruption of the lower half of his back extending onto the buttocks, which was thought by the surgeon and author to be due to Merthiolate (brand of thimerosal) applied in preparation for the spinal anesthesia, but subsequent investigation revealed that tincture of benzalkonium chloride had been used for skin preparation. The rest of the patient's body was involved in an urticaria-like eruption. He was receiving penicillin at the time. The eruption rapidly subsided and on 5 March a right inguinal hernioplasty was performed. Merthiolate was not applied to any portion of his body for preoperative skin preparation. The surgeon used only phisohex and water to prepare the abdomen and the anesthetist used tincture of benzalkonium chloride prior to the spinal anesthesia. Pontocaine was again used as the spinal anesthetic. About 12 hours after the completion of the operation the patient was again noted to have an acute, vesicular, and severely pruritic eruption that rapidly became generalized to most of the body surface but remained most severe in the area of the application of the tincture of benzalkonium chloride. The eruption subsided in four or five days with the application of continuous wet dressings and a bland drying cream.

After the acute reaction subsided the patient was open patch tested to three samples of tincture of benzalkonium chloride obtained from stock solutions in each of the main operating rooms and to undiluted Merthiolate. Twenty-four hours following the patch tests there was noted an acute vesicular eruption at the site of the benzalkonium chloride applications while at the site of the Merthiolate application there was no reaction whatsoever. Subsequently he was patch tested in a new site to an aqueous solution of benzalkonium chloride and adhesive tape. After 48 hours no reaction was noted to either of these patch tests.

The dye used in the benzalkonium chloride (tincture) is D&C red No 39 commonly called alba red (ortho [para (beta beta prime dihydroxy diethylamio)-phenylazo] benzoic acid). The benzalkonium chloride solution used at this hospital is a 0.1 per cent solution containing alcohol, acetone, distilled water, and 0.02 per cent alba red dye.

On 21 March patch tests to Benadryl (brand of diphenhydramine hydrochloride), sulfadiazine, Benzocaine (brand of ethylaminobenzoate), Pontocaine, Pyribenzamine (brand of tripeleminamine hydrochloride)

several chemically related compounds. These cross sensitizations can be explained by the following possibilities of an immunochemical relationship between the primary and the secondary allergens<sup>17</sup>

1 The primary allergen and the secondary allergen may be so closely related immunochemically (*e g*, contain identical allergenic groups) that the sensitized cells cannot differentiate between them and thus react toward them as if they were identical (group specificity)

2 The primary allergen is converted (reduced, oxidized et cetera) in the body into an agent which is identical with or so closely related to the secondary allergen that the sensitized cells cannot differentiate between them

3 The secondary allergen is converted in the body into an agent which is identical with or so closely related to the primary that the sensitized cells do not differentiate between them

4 Both the primary and the secondary allergens are converted in the body into agents which are either identical or so closely related that the sensitized cells do not differentiate between them

These possibilities of direct cross sensitizations must be differentiated from indirect cross sensitizations or reactions which are produced by concomitant factors. Thus certain cross reactions<sup>18</sup> may occur when a sensitizing compound contains in addition to its principal allergen one or more other substances with allergenic potential (*e g*, contaminants) which themselves may give rise to independent sensitizations or elicit dermatitis in already sensitized skin

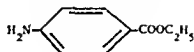
### CASE REPORT

A 39 year old man was admitted to this hospital on 7 January 1956 because of tight flank pain and hematuria of 30 hours duration. Past history failed to reveal evidence of previous episodes of abdominal pain, hematemesis or tarry stools. He had been in the naval service from December 1941. His mother and a sister died of tuberculosis. There was no family history of cancer, diabetes, calculi or previous skin diseases except that he was told he had exhibited sensitivity to a sulfa drug\* in 1949. The specific sulfa drug was unknown.

Physical examination on admission showed only tight flank tenderness producing pain radiating into the right anterior abdominal wall and into the right testicle. Temperature was 98.6°F, pulse 68 and blood pressure 120/62 mm Hg. Inguinal hernias were present bilaterally. A roentgenogram of the chest was normal. The white blood cell count, differential, red blood cell count, hemoglobin and sedimentation rate were reported as being within normal limits. Examination of the urine



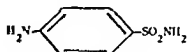
Para aminobenzoic acid



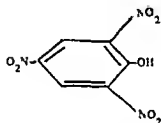
Ethyl aminobenzoate



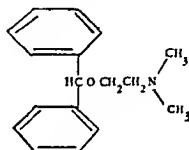
Paraphenylenediamine



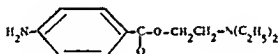
Sulfanilamide



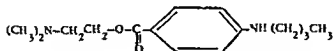
Trinitrophenol



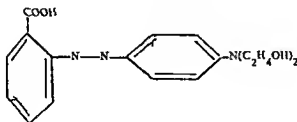
Orphenhydramine hydrochlorid



Procaine



Tetracaine hydrochloride



Alb red

Figure 1 Structural relationships of compounds producing reactions in patient

tion is to be prevented. Increased awareness of this problem makes it possible not only to avoid the primary allergen but, in addition, the immunochemically related (secondary) allergens.

## REFERENCES

1. Ja-assohn, J. Zur Kenntnis der medicamentösen Dermatosen. *Verhandl. d. deutsch. dermatol. Gesellsch. Congre.* 5: 103-129. 1896.
2. Goodman, J. and Salzberger M. B., Patch test with therapeutic agents. *Arch. Dermat. & Syph.* 35: 944-945 May 1937.
3. Bloch, B. Experimentelle Studien ueber das Wesen der Jodoform-Josynkras. *Zschr. f. exper. Path. u. Therap.* 9: 509. 1911.
4. Salzberger M. B. *Dermatologic Allergy*. Charles C Thomas Publisher Springfield, Ill., 1940. pp. 87-128.
5. Rotman, S., Orland, F. J. and Fisch, P. Group specificity of epidermal allergy to procaine in man. *J. Invest. Dermat.* 6: 191-199 June 1945.
6. Suruss, M. J. Group sensitivity to local anesthetic: confirmation of possibility of its occurrence and demonstration that it does not necessarily always take place. *J. Invest. Dermat.* 8: 403-407 Jan. 1947.
7. Baer, R. L. and Mizer, L. Sensitization to monoglyceryl para-aminobenzoate: preliminary report. *J. Invest. Dermat.* 11: 5 July 1948.
8. Goodman, M. H. Cutaneous hypersensitivity to procaine anesthetic: correlation of hypersensitivity with chemical structure. *J. Invest. Dermat.* 2: 53-66, Apr. 1939.
9. Schwarzschild, L. Sensibilisierungsversuche an der Orthoform-eib. *Arch. f. Dermat. u. Syph.* 156: 432-445 1938.
10. Jones, B. M. Procaine dermatitis: series of cases and an effort to determine chemical groups responsible for hypersensitivity to. *J. A. M. A.* 97: 440-443 Aug. 15 1931.
11. Walron, G. W. Hypersensitivity to procaine. *Proc. Staff Meet. Mayo Clin.* 9: 254-256 Apr. 25 1934.
12. Liden, E. L. and Rubin, L. Specificity of cross-sensitivity: para-aminobenzoic acid butyl ester ("but sin"). *Proc. Soc. Exper. Biol. & Med.* 66: 451-452 Nov. 1947.
13. Phillips, B. Clinical study of sulfonamide dermatitis. *Brd. f. Dermat.* 58: 213-227 Sept.-Oct. 1945.
14. Salzberger M. B., Kanof, A. B. et R. L., and Lowenberg, C. Sensitization by topical application of sulfonamides. *J. Allergy* 18: 92-103 Mar. 1947.
15. Dobkevitch, S. and Baer, R. L. Eczematous cross-hypersensitivity to azo dyes in nylon stockings and to para-benzyl methanin. *J. Invest. Dermat.* 9: 203-211 Oct. 1947.
16. Baer, R. L., Liden, E. M., and Mayer, R. L. Possible eczematous cross-hypersensitivity between para-phenylenediamine and azo dyes certified for use in food, drugs and cosmetics. *Proc. Soc. Exper. Biol. & Med.* 67: 489-494 Apr. 1948.
17. Baer, R. L. Example of cross-sensitization in allergic eczematous dermatitis. *Arch. Dermat. & Syph.* 58: 26-285 Sept. 1948.
18. Landsteiner, K. *The Specificity of Serological Reactions*. Harvard Univ. Press Cambridge Mass. 1945 p. 197.

# Ruptured Omphalocele

ROBERT C RAY, *Captain, MC USN*

**A**N OMPHALOCELE is caused by persistence of the normal fetal condition in which the mid gut is transferred temporarily into the base of the umbilical cord. The protrusion, which occurs in the fifth to twelfth week, probably results from an inequality of growth between the abdominal parietes and the more rapidly developing abdominal organs. During this period the rate of growth of the abdominal cavity accelerates, and usually by the tenth or eleventh week it is of sufficient size to reaccommodate the displaced viscera.<sup>1</sup>

Sometimes the inequality in size between abdominal cavity and abdominal viscera persists, and the intestines and a portion of the liver remain in the base of the umbilical cord. Other organs that occasionally are protruded include stomach, spleen, pancreas, and transverse and descending colon. Eventration of liver and intestines occurs in about 1 in 10,000, and herniation of intestines alone in 1 in 5,000 births.<sup>2</sup>

When a child is born with this condition, the displaced abdominal contents are covered only by a translucent sac through which the organs can plainly be viewed.<sup>3</sup> Occasionally the sac is ruptured in utero or during parturition.

Infants with omphalocele must undergo prompt and radical repair if any hope is to be held for their survival. Optimum conditions are presented if the sac is intact and small, and the peritoneal cavity sufficiently developed to permit a one stage procedure without overcrowding. Trying to put "two pounds in a one pound bag" will result, as observed by Denman and Lomas,<sup>4</sup> only in respiratory embarrassment, compromise of venous return, or possibly a mechanical obstruction of the intestinal tract. When a large sac must be returned to a small, underdeveloped peritoneal cavity, a two stage procedure is necessary to create, by undermining, skin flaps which are large enough to cover the protruded organs. Even with this lifesaving measure, the skin must sometimes be closed under such tension that some embarrassment of vital function occurs.

---

From Station Hospital U S Naval Station Kodiak Alaska. Capt. Ray is now assigned to U S Naval Hospital San Diego Calif.

When the sac is ruptured at birth the hazard of infection is superimposed upon an already precarious situation and prior to the advent of chemotherapy none of these infants survived the peritonitis which ensued. When rupture occurs during delivery the outlook is more favorable than when it occurs in utero. Rupture during parturition as in the case reported by Lane<sup>3</sup> still presents the sac content in a somewhat pristine state whereas a gut that has been constantly bathed in amniotic fluid becomes thickened and edematous. Such a case was described by Bell and Brown.<sup>4</sup> This further increases its natural volume and makes the problem of replacement or cover more difficult.

### CASE REPORT

On 4 July 1956 a 17 year-old primagravida was delivered of a full term female infant weighing 5 pounds 10 ounces. The prenatal course had been uneventful and uncomplicated. The patient was delivered by low forceps after a 6-hour labor.

At birth it was noted that the infant had a large ruptured omphalocele. The coils of gut were swollen and had a darkly reddened somewhat granular appearance. They were matted together and it appeared that rupture had taken place in utero and some time previously.

The infant was cyanotic and had a weak feeble cry. No other gross abnormalities were evident. The everted organs were covered with a warm moist sterile dressing and a small dose of caffeine and sodium benzoate was administered. The stomach was intubated with a No. 12 French catheter and the infant was placed in an incubator in an oxygen-enriched atmosphere.

Three hours after birth under light open-drop ether anesthesia the dressings were removed and the coils of gut gently lavaged with physiologic saline solution. It was found that a portion of stomach the duodenum the mid gut and the major portion of the hind gut were everted through a musculofascial defect about 8 cm. in diameter. Only a small remnant of sac was in evidence. This was attached about the umbilical vessels which lay in the left mid portion of the defect. The loops of the gut were grossly thickened and edematous. There was no evidence of volvulus or of atretic stenotic or duplicated portions of the intestinal tract.

Only a small portion of the viscera could be replaced in the peritoneal cavity. Accordingly flaps were fashioned by extensive undermining and the skin was closed under a moderate amount of tension.

The infant reacted well and was returned to her incubator in good condition where she was continued on gastric suction and started on an intensive course of penicillin and dihydrostreptomycin sulfate.

Continuous gastric suction was maintained for 12 hours at the end of which time the tube was removed because of temporary respiratory em-

barrassment Thereafter, the infant was intubated and the gastric content aspirated every four hours

Fluids consisting of equal parts of 5 per cent dextrose in distilled water and of normal saline solution were administered parenterally in the amounts of 20 ml per pound of body weight per 24 hour period This kept the infant a little on the "dry side " but true dehydration was never a problem under this regimen

Beginning on the second day small amounts (60 ml) of 5 per cent dextrose were given by gavage following gastric aspiration and shortly thereafter this was replaced by half strength house formula

On the fourth day high pitched peristaltic sounds were audible Oral feedings in small amounts (from 30 to 45 ml) were started and were avidly taken by the infant A portion of the feeding would sometimes be propulsively vomited a few minutes after ingestion Following emesis the infant would be refeed and would nurse eagerly The possibility of a high mechanical obstruction was considered but the general condition of the infant remained fairly good and it was believed that all these manifestations could be explained by the slow recovery of tone of the thickened edematous bowel Although the vomiting persisted to some extent until the tenth day some of the feeding was being retained

Small twice daily, normal saline enemas were started on the fourth day with recovery of much meconium and thick, ropy mucoid material On the tenth day the infant began to pass meconium spontaneously and two days later the first stool containing digested milk curds appeared Following this progress was rapid and the infant was discharged home in the fourth week Weight at time of discharge was 7 pounds and 4 ounces

Figure 1 taken on the day of discharge shows the large ventral herniation and the crusted but firmly healed operative wound Unfortunately preoperative photographs were technically unsatisfactory



Figure 1 Photograph taken in the fourth week. Note the large ventral herniation and the crusted but firmly healed operative wound.



The child has been seen periodically as an outpatient. She continues to thrive and gain weight. No other congenital defects have been discovered to date. It is estimated that at her present rate of development she will be ready for the second stage operation in from 12 to 15 months.

#### REFERENCES

- 1 Davis L (edito) Christophers *Textbook of Surgery* 6th edition, W B Saunders Co Philadelphia Pa 1956 pp 530-533
- 2 Nilo W E (edito) *Textbook of Pediatrics* 6th edition, W B Saunders Co Philadelphia Pa 1954 p 290
- 3 Gross R E *The Surgery of Infancy and Childhood*, W B Saunders Co Philadelphia Pa 1953 pp 406-427
- 4 Denma F R, and Lomas R D Ruptured omphalocele with distended obstructed. *M Rec & Ann*, 47 694-695 Nov 1953
- 5 Lister W H Jr Hernia in umbilical cord clarification and report of case. *New England J Med*, 253 466-467 Sept 15 1955
- 6 Bill L S and Brown H A Ruptured omphalocele complicated by laceration of stomach. *J Pediatr* 44 79-84 Jan 1954

#### BACK TO THE BOTTLE

No compelling evidence of physiological advantage or disadvantage attending the early feeding of solid foods has appeared. One thing seems to have been shown—the infant's digestion and assimilation are much more adaptable than was once thought, but it is an open question whether we should take advantage of this fact. In an age in which civilization is constantly chipping away at the simple uncomplicated animal aspects of human life, there seems reason to protest against any hurry to relinquish the natural suction of one warm liquid food in favor of the cultivation of a battery of acquired tastes by the unnatural means of spoon and cup.

—CLEMENT A SMITH M D

in *Journal of the American Medical Association*  
p 779 June 23 1956

## A MESSAGE FROM THE A M A

Since July 1952, the Council on National Defense of the American Medical Association has conducted an opinion survey among physicians being released from active military service. The questionnaire used in the survey is primarily designed to obtain pertinent data based on the physician's observations and opinions while in the Armed Forces, concerning the utilization of physicians and the medical staffing conditions in the uniformed services. The questionnaire also calls for comments and suggestions of ways to further improve the medical services as well as ways and means whereby organized medicine can be of greater assistance to military physicians.

The following report is based on the returns received in 1955. During that 12 month period, the Council sent out 3,651 questionnaires, of which 2,191 were completed and returned. This represented a 60 per cent response.

**Date of Graduation from Medical School.** About half of the physicians replying (1,108) were graduated from medical school between the years 1945-1949, the second largest group, 503 or 23 per cent, graduated in 1950 or later. There were 449 or 20 per cent graduating between the years 1940-1944. Less than 2 per cent graduated before 1940. Eighty-nine failed to indicate the year of graduation from medical school.

**Years of Internship and Residency.** As was the case in the summary report covering the last six months of 1954,<sup>1</sup> the largest group replying to this question (497 or 23 per cent) had completed three years of residency training, while the second largest group (450 or 20 per cent) had had no residency training at the time of entrance on active military duty. There were 369 or 17 per cent with one year of residency training, 347 or 16 per cent with two years, and 268 or 12 per cent with four years. Those who failed to answer the question totaled 260.

**Occupation at Time of Entering Service.** The largest groups of physicians who served in the Army (28 per cent) and the Air Force (32 per cent) were engaged in general practice at time of

---

<sup>1</sup>From the Council on National Defense of the American Medical Association. The views and opinions expressed are not necessarily those of the Department of Defense.—Editor

entrance on active duty while the largest group in the Navy (26 per cent) were in residency training. The last summary report reflected the largest groups in all three services were engaged in residency training prior to active military service. In the Army group specialty or industrial practice was second while in the Navy it was general practice and in the Air Force it was residency training. There were 12 per cent of the Navy group, 10 per cent of the Air Force and 5 per cent of the Army engaged in internship training immediately prior to entrance on active duty.

**Number of Physicians Holding Board Certificates.** Of the 290 persons responding to this question, 128 holding specialty board certificates were in the Army, 93 were in the Navy and 69 were in the Air Force. The specialties covered over 19 different fields of which the largest was internal medicine, the second largest was pediatrics and the third largest was surgery. It is interesting to note that in the previous summary report<sup>1</sup> surgery was first, followed by pediatrics and internal medicine. By branch of service, a total of 25 per cent of those responding in the Army and Navy and 17 per cent of those in the Air Force had specialty board certificates.

**Reserve Status.** Of the 2,191 physicians reporting, 764 indicated that they retained their reserve commissions while 1,407 resigned. Twenty did not respond. In the Army, 242 retained their commissions and 722 resigned. The Navy had 351 retaining and 182 resigning and the Air Force had 171 retaining and 503 resigning.

**Distribution by Rank at Time of Discharge.** The majority of physicians in the Army and Air Force held the rank of Captain at the time of their release from active military duty. In the Navy, the majority were in the rank of Lieutenant (junior grade). Over 97 per cent of the reporting physicians, or 2,135, answered this question. The survey indicated that approximately 27 per cent of those who reported were in the lowest rank while 64 per cent held the rank of Captain or Lieutenant (Navy). There were about 7 per cent with the rank of Major or Lieutenant Commander and higher.

**Government Medical Education Received.** Of the 2,191 physicians responding, 1,153 stated that they had received assistance from the Government in their medical education. There were 1,013 who indicated no governmental assistance and 25 failed to answer the question. The largest single group receiving governmental assistance was under the Navy V-12 Program. The next largest groups were under the Army Specialized Training Program and the GI Program.

**Training Received While in Service** There were 1,814 physicians who answered this question concerning the types of military medical training received while on active duty, while 377 physicians did not respond to the question. All of those responding indicated that they had received additional training or experience in service schools, 916 in the Army, 317 in the Navy, and 581 in the Air Force. The Medical Field Service School accounted for the largest number, with the School of Aviation Medicine accounting for the second largest group. In the Army group, 87 per cent received the Basic Course training of the Medical Field Service School, while 13 per cent in the Navy and 41 per cent in the Air Force attended the School of Aviation Medicine.

The second part of the results of this interest opinion survey will be reported in the next issue of this *Journal*.

#### REFERENCE

1. Message from the A M A U S Armed Forces M J 6 1535 1536 Oct 1955
- 

#### Rx NOSE DRDPS

Do not prescribe nose drops unless they are truly indicated. If they are indicated be sure to use a preparation that does not disrupt the physiology of the nasal mucosa and impair its native ability to combat infection. Oils, aromatic irritants, and antiseptics are unphysiologic. Nose drops should be aqueous, isotonic, and slightly acid. Any doctor can write an extemporaneous prescription for nose drops that fulfills these requirements, and such a medication is superior to any of the proprietary preparations for most patients.

—JESSE D. RISING, M.D.

*in Missouri Medicine*

p. 776 Sept. 1954

## NAVY SURGEON GENERAL RECEIVES FRENCH MEDAL OF HONOR

Rear Admiral Bartholomew W Hogan Surgeon General of the U S Navy was decorated on 10 January 1957 with the "Medaille de vermeil" the Medal of Honor of the French Naval Medical Service



Rear Admiral Louis Mornu Naval Attache at the French Embassy in Washington D C presented the medal in recognition for the distinguished services Admiral Hogan rendered to the French Navy Medical Corps

In accepting the decoration Admiral Hogan stated that to receive this honor from such a great nation was truly a rare privilege and a proud moment not only for him but for the Medical Department of the U S Navy Official acceptance of the medal will require Congressional approval

## OFFICERS CERTIFIED BY SPECIALTY BOARDS

### Supplementary Listing

According to information from the Offices of the Surgeons General of the military medical services, the following regular Medical Corps officers have been certified by the boards indicated since the listings published in previous issues of this *Journal*

#### American Board of Pediatrics

Charles W. Reiskam Capt USAF

#### American Board of Dermatology and Syphilology

Harold K. Alsabrook Lt Comdr USN

Edward G. Hurlbur Capt USN

#### American Board of Radiology

Byron G. Brogdon Capt USAF

Marshall W. Olson Lt USN

Walter F. Hansen Comdr USN

Harwood N. Stuttevant Maj USAF

#### American Board of Internal Medicine

Frank M. Bryan Lt Comdr USN

Herschel E. Richardson Capt USN

Arthur R. Errison Capt USN

#### American Board of Ophthalmology

Wayne L. Erdbrink Lt Comdr USN

Walter Patterson Capt USN

#### American Board of Otolaryngology

Louis P. Ballenberger Capt USN

Robert L. Kior Jr Comdr USN

Peter J. Giotta Capt USN

Bentley A. Nelson Lt USN

#### American Board of Surgery

James B. Anderson Maj USAF

James A. Kaufman Comdr USN

Bruce F. Baisch Comdr USN

Edward W. Pinkham Capt USN

Howard A. Baker Comdr USN

Paul G. Richards Capt USN

Daniel W. Boone Capt USN

Charles E. Rogers Comdr USN

Carl A. Broadbuss Jr Lt Comdr USN

Edward J. Rupnik Lt Comdr USN

Donald J. Doohen Lt Comdr USN

George W. Russell Capt USN

Alexander C. Hering Comdr USN

Melvin B. Sullivan Lt USN

#### American Board of Anesthesiology

Donald R. Buechel Lt USN

#### American Board of Neurological Surgery

Gale G. Clark Comdr USN

**American Board of Preventive Medicine  
Founders Group in Occupational Medicine**

Henry J. Alvord Capt USN  
Theodore C. Bedwell Col USAF  
Albert R. Behnk Capt USN  
Gerald J. Duff Jr Capt USN

Oscar Schelder Capt USN  
Howard K. Sessions Capt USN  
Edward J. Tracy Brig Gen USAF  
Oscar D. Yarbrough Capt USN

**American Board of Thoracic Surgery**

James D. King Capt USN

---

**PREVENTIVE MEDICINE COURSE FOR MEDICAL OFFICERS**

The Military Preventive Medicine Course (Course 8037) that will begin on 3 September 1957 at Walter Reed Army Institute of Research, Walter Reed Army Medical Center, Washington, D. C., presents interesting opportunity for medical officers of the Armed Forces.

The course concerns the prevention and control of disease and injury in the military as well as in civilian communities. Emphasis is placed on the global aspects of military preventive medicine with particular attention to health problems of the arctic and tropical areas. Covering 48 weeks of academic studies, the course includes field trips or investigations and individual or committee studies. Selected Army graduates of the course will be eligible for entry into the Army's recently announced preventive medicine residency program.

The American Board of Preventive Medicine has approved this course as an equivalent of its requirement for the Master of Public Health degree. A bill is now before Congress which would authorize the granting of postgraduate degrees including that of Master of Public Health by the Walter Reed Army Institute of Research.

Regular Army Medical Corps officers or qualified physicians who accept commissions in the Regular Army are eligible for the course. Qualified officers from the Navy and Air Force medical services, the U. S. Public Health Service, and representatives of other governmental agencies may be admitted by mutual agreement between the Army Surgeon General and the chief of the government agency desiring to participate. Civilian physicians may apply by writing to The Surgeon General, Department of the Army, Washington 25, D. C. Attention: Personnel Division. Military personnel should apply through appropriate channels.

## Reviews of Recent Books

OFFICIAL HISTORY OF THE CANADIAN MEDICAL SERVICES 1939 - 1945  
 Volume One Organization and Campaigns Edited by W R Feasby M D  
 568 pages illustrated in color with paintings and photographs by Canadian War Artists and Photographers Maps drawn by Captain C C J Bond Published by Edmond Cloutier C M G A O D S P Queen's Printer and Controller of Stationery Ottawa, Ontario Canada 1956  
 Obtainable from the Superintendent of Government Publications Department of Public Printing and Stationery, Ottawa, Ontario, Canada Price \$5 postpaid

The medical administrative histories published through the past decade have had varying degrees of merit but the present volume would seem to surpass them all Except for one or two weaknesses, it is a brilliant example of how to write military medical history

The treatment of the subject matter appears to be objective and fairly presented The historian treats equally the strengths and the weaknesses of the medical services and their effect upon the war effort Particularly significant from the organizational and administrative viewpoint are the opening chapters and the later chapters beginning with Chapter 19 through the remainder of the volume

Under the able editorship of Dr W R Feasby, Canadian Medical Historian and his associates, this volume—one of two—treats the Canadian Medical Services in World War II The Royal Canadian Army, the Royal Canadian Navy, the Royal Canadian Air Force and the Royal Canadian Dental Corps along with the contributions of the civilian services connected with the medical aspects of the war effort are described in terms of medical organization and development to support the military mission in the many campaigns of World War II Large scale topics treated include those of manpower procurement and assignment of medical personnel The narrative carries through until the reader is aware of how these large scale problems had tangible meaning in terms of winning or losing a battle

Thus never are functional problems isolated from the military framework of command and operations insofar as the Mediterranean and European Theaters of Operations are concerned Beginning with background chapters about the military medical service on the eve of war and the status of mobilization plans the volume traces the overseas movement of troops and follows them campaign by campaign through the Dieppe Raid the Sicilian Campaign the Invasion of Normandy, the Rhineland Offensive and the Final Phase and Occupation Accompanying this extensive narrative treatment are beautifully executed maps and illustrations in color which this reviewer has not seen in any other medical history of the period



The one weakness is Chapter 18 "Hong Kong" a three page summary chapter which represents the only treatment of Pacific warfare. Equally disappointing is the fact that there is no mention of the China Burma India Theater except briefly on page 570.

Perhaps the serious student comparing the medical services of the Allies would also like to know in more detail the types of documents on which the historian has based his narrative.

This volume together with the previously published volume on clinical medicine completes the official historical record of the Canadian Medical Services. It is a record that all serious students of medical history—whatever nationality and whatever service—can study with rich reward. It is a volume that reads equally well to the student of military history. —*MAE M. LINK, Ph D*

**BOTANY** by *Paul Weatherwax*, 3d edition 509 pages illustrated W B Saunders Co Philadelphia Pa. 1956 Price \$5.75

This book was first printed in 1942 as a text for a basic collegiate course in general botany. In the present edition errors have been corrected and difficult sections clarified.

The work is divided into two parts the first dealing with general plant morphology and physiology. Structure nutrition growth photosynthesis reproduction ecology and plant communities and economic botany are well covered. Particularly good are chapters on dormancy and seed dispersal heredity and evolution. The second part describes the various classes of plants including the cryptogams with short notes on botanical history and plant fossils.

The numerous illustrations are clear and are so placed in relation to the text that reference to them is easy a desirable feature sometimes not found in scientific books. There is a glossary of over 1200 definitions and a useful index. The book is an excellent text for pre medical and pharmacy courses. —*LOUIS H. RODDIS Capt MC USA (R L)*

**THE HABIT OF TOBACCO SMOKING** by *W Koskousk* M D 292 pages Staples Press Limited London England Publishers Distributed in U S A by John de Graff Inc New York N Y 1955 Price \$5

This book is divided into two parts. Part 1 (historical review) describes the discovery of tobacco the forms of tobacco used and the various customs and practices associated with the tobacco habit that have evolved through the years to the present time. The great significance that the use of tobacco has had on the economic psychological biologic and social development of society is described. The statistics presented emphasize clearly the staggering economic importance of tobacco.

Part 2 (the action of tobacco and its compounds on the human organism) reviews present day knowledge of the action of tobacco broken down into the various active principles and their action on the

systems of the body. The data given are factual and the author presents these for review without crusading for or against the use of tobacco. He has been very objective in his presentation and to those physicians who wish a very clear and concise summary of the influence of tobacco under various conditions this book is recommended. For those physicians who have followed only radio television and news print comments on the relationship between tobacco and malignant disease this book presents a digest of the evidence available, and should serve to crystallize their thoughts on the subject. This book will give the busy physician factual ammunition to better answer the many questions asked by patients. Dr. Koskowski also points out the many channels of experimentation which are still open to investigators and emphasizes the tremendous problems yet to be answered.

The style of the book is light and pleasant, and the statistics are well placed. This book should appeal to physicians in all major specialties of medicine. —PAUL C. LE GOLVAN, Lt Col MC USA

BIOCHEMISTRY FOR MEDICAL STUDENTS by William Veale Thorpe M A (Cantab) Ph D (Lond) 6th edition 542 pages 48 illustrations J B Lippincott Co Philadelphia Pa 1956 Price \$6.75

Initial brief chapters of this book on the physicochemical principles pertinent to biochemistry are followed by a presentation of the fundamental chemistry of the major categories of foods animal pigments enzymes and of oxidation and reduction. Subsequent chapters are devoted to the composition of blood tissues and excretory products the biochemistry of absorption and digestion and the intermediary metabolism of carbohydrates, lipids and proteins. This partial inventory will serve to identify the classical pattern of a biochemistry text intended for the medical student. Like its predecessor the current edition has the virtue of clarity of language and of readability applied to an extremely large amount of diverse subject matter.

The volume contains a brief but apt chapter on the use of isotopes in biochemical studies. Similar attention is accorded the metabolic interrelationships and syntheses occurring in vivo. Separately and together these chapters should facilitate the student's transition from the relative security of his textbook to the less familiar terrain of the current literature in biochemistry and physiology. Equally welcome is the chapter dealing with "detoxication" processes which the title entitles and develops as the metabolism of foreign organic compounds.

The treatment of nutrition and of related topics is laudably conservative although the references to feeding patterns and to certain foodstuffs in Great Britain might be expected to have a certain relevance for the American reader. The chapter on hematology is identical with that which appeared in the previous edition. Reasonably sufficient as an introduction to the subject.

chemistry this chapter nevertheless fails to convey the significance of hormonal interrelationships in the intact organism

The author has made excellent use of diagrammatic representations to summarize cardinal metabolic pathways e g the tricarboxylic acid cycle and interrelationships in the metabolism of proteins fats and carbohydrates In the presentation of tables and figures the book is exemplary The layout of the many formulas used is particularly effective and constitutes an invitation to learning

—THADDEUS J DOMANSKI Col USAF (MSC)

THE YEAR BOOK OF MEDICINE (1956-1957 Year Book Series). Part I Infections by Paul B Heeson M D Part II The Chest by Carl Muscheheim M D Part III The Blood and Blood Forming Organs by William B Castle M D Part IV The Heart and Blood Vessels and the Kidney by Tinsley R Harrison M D Part V The Digestive System by Franz J Ingelfinger M D Part VI Metabolism by Philip A Bondy M D 744 pages illustrated The Year Book Publishers Inc Chicago Ill 1956 Price \$6 75

In this era of increasing abundance of medical literature and the tendency to condensation the Year Books have been timely and valuable This volume continues in the successful pattern of its predecessors by providing excellent abstracts of the world literature prepared by recognized authorities on infections the chest the blood and blood forming organs the heart and blood vessels the kidney the digestive system and metabolism Included as always are many sagacious and often pungent annotations by the editors a comprehensive index so often lacking in medical books and numerous illustrations the latter of a much higher quality than heretofore seen in this series

Although in no way a substitute for medical literature as such by reason of necessary brevity these groups of abstracts permit the reader to keep up to date in broad subspecialty fields that may lie outside his current experience The helpfulness of the Year Books of Medicine to the physician preparing for specialty board examinations is becoming legendary

The general practitioner as well as the internist will profit by having this volume close at hand It is a real bargain

—ROBERT K MOXON Comd MC USN

SURGERY OF THE HAND by Sterling Bunnell M D 3d edition 1 079 pages 1 047 illustrations and 9 color plates J B Lippincott Co Philadelphia Pa 1956 Price \$22 50

This text is again revised in a thorough manner and brought up to date with the recent advances in this specialized field of surgery The revision enlarges the book by some 130 pages and includes additional text and illustrative material In addition there are revisions in the older material as well which makes for better readability

This book is unique in medical literature It is the only complete text on surgery of the hand in publication indeed little more can be

learned through outside reading. The material is well organized and carefully presented, and is based upon the vast personal experience of the author and his associates. It is highly recommended to all who might be called upon to treat hand injuries, and should be required reading for those in surgical training whose specialty involves the hand, namely the plastic surgeon, neurosurgeon, general surgeon, and certainly the orthopedist. —STIRLING J. RITCHIE, COL. USA

THE CLINICAL PSYCHOLOGIST by William A. Hunt, Ph.D. 206 pages  
Charles C. Thomas, Publisher, Springfield, Ill., 1956. Price \$5.50

The author is chairman of the department of psychology and lecturer in psychiatry at the medical school of Northwestern University. He is thus adequately prepared to discuss the main theme of his subject, namely the relationship between medicine and psychology. Without mincing words he lays bare the central problem of psychologic practice: namely, should the qualified clinical psychologist do psychotherapy?

By exploring definitions and by giving a careful analysis of the problem the author has made a major contribution. Most clinical psychologists are seriously occupied with this problem, and the book is believed to be essential reading for all of these. Students who plan to enter the field of clinical psychology should be interested in reading Dr. Hunt's point of view because their appraisal of a career in psychology may be inadequate without this realistic reminder of the presence of controversies in the field—controversies about which not much is said in the classrooms. Above all, psychiatrists, psychoanalysts, physicians, and social workers will find the volume helpful in understanding the clinical psychologist and his approach to his work.

Besides the major emphasis, the book describes the training of clinical psychologists and mentions the commonly used psychologic techniques. Some psychologists would not agree with the author's remarks on Freud. Nor would all psychologists agree on the role Dr. Hunt has assigned to diagnostic testing in the evaluation of the clinical psychologist's work. This book is worth reading by all those interested in mental health, although the thoughtful reader will not always agree with the author. —THEODORF C. KAHN, Maj. USAF (MCG)

THE MANAGEMENT OF MENSTRUAL DISORDERS by C. Frederic Fluhmann, M.D.C.M. 350 pages, illustrated. W.B. Saunders Co., Philadelphia, Pa. 1956. Price \$8.50

In this volume Dr. Fluhmann has succeeded in presenting an oft-misunderstood subject in a clear, direct manner that should help both the practitioner and student in handling the many patients who present themselves for the care and treatment of menstrual disorders.

Controversial problems are covered in such a way as to inform the reader of the various viewpoints, allowing him to form his own impression.

sion and enabling him to follow up the particular subject by presenting a fairly complete well selected list of references in the bibliography at the end of each chapter. The role of the gonadotrophic and steroid hormones in menstruation is discussed in an easy manner conducive to sound understanding of the role they play in initiating and discontinuing the menstrual function.

The last chapter is an up to the minute review of modern day clinical usage of the sex hormones with a well outlined presentation of the numerous leading commercial preparations that stresses the routes of administration usual accepted dosage levels and the products trade name and manufacturer —MORRIS M. RUBIN *Capt MC USA*

CLINICAL EXAMINATIONS IN NEUROLOGY by Members of the Section of Neurology and Section of Physiology Mayo Clinic and Mayo Foundation for Medical Education and Research Graduate School University of Minnesota Rochester Minn 370 pages illustrated W B Saunders Co Philadelphia Pa 1956

This book deals with the systematic presentation of neurologic examination as practiced by the members of the sections of neurology at the Mayo clinic. The compilation of a book on the neurologic examination is extremely difficult as many tests that are included in the examination by some neurologists are preferred to others which are sometimes better known. Nevertheless in this work the reviewer feels that the authors have done an outstanding job in selecting the most significant methods of testing for manifestations of neurologic dysfunction. This book is not intended to be an esoteric chronicle of the more obscure manifestations but rather a practical guide to the student to the intern and to the beginner in neurology interested in learning convenient office procedures which will aid in the evaluation of neurologic conditions. In this respect this book is outstanding.

The authors have selected tests concerning which there is general agreement among most neurologists as to their value. The methods are briefly and concisely explained and are augmented by statements as to the functional significance of the normal or abnormal manifestations. The authors have taken great pains to eliminate controversial material and have done a very skillful job of editing this volume. While it offers little that is new to the specialist there are few specialists who would not feel that a perusal of the volume was a rewarding experience representing as it does an orderly treatise on the neurological examination. Only a very few adverse criticisms can be leveled at the work. Perhaps one might be the numerical gradation of reflex activity and of sensory response in the clinical neurologic examination.

This volume is recommended to the practicing physician who maintains an interest in neurologic conditions and to residents or fellows undergoing training in the specialty of neurology.

—ROY E. CLAUSEN *Jt Col MC USA*

March 1957)

**CHEMOSURGERY IN CANCER: GANGRENE AND INFECTIONS** featuring a New Method for the Microscopically Controlled Excision of Cancer, by Frederic E. Mohr, B. Sc. M. D. 305 pages illustrated Charles C. Thomas Publisher Springfield Ill. 1956 Price \$13.50

This monograph represents 25 years' experience by a singularly zealous worker. Almost single handedly he has fostered the development of this very controversial method of cancer treatment. The method which he calls chemosurgery consists of chemical fixation of the tumor in situ with zinc chloride solution and staged surgical excision with repeated microscopic examinations of the tissue in the bed of the lesion to assure complete removal.

The caustic treatment of neoplasms goes back to antiquity. In the last century many quacks in this country were infamous for their misuse of caustics in cancer. However, Doctor Mohr's real contribution, which removes his technique from such a class, is his histologic control of the process. He has developed considerable skill in hisologic technique. Frozen tissues are studied right in the clinic upon removal in order that the proper orientation of the sections can be made. The microscopic extension of cancer beyond its grossly visible or palpable extent can then be studied.

His wide application of the method is well documented by numerous excellent photographs, case histories and end result statistics. In addition to squamous and basal cell carcinoma of the skin, he treats carcinoma of the lip, accessory nasal sinuses, larynx, parotid, penis, vulva, et cetera. Perhaps most controversial is his chemical cautery treatment of melanomas and pigmented nevi. Here again his results have been excellent.

The author has published numerous papers containing much of the material in the book. His material is presented precisely and quite convincingly. One wishes that such ability, high motivation and sincerity could be devoted to a more challenging aspect of cancer therapy.

This book will be of value for medical libraries as a definitive work in this limited field. —ROALON GRANT, Capt. MC USA

**CLINICAL ROENTGENOLOGY** Volume IV The Digestive Tract, the Gall Bladder, Liver and Pancreas, the Excretory Tract and Special Studies Emphasizing Differential Considerations by Alfred A. deLoraine, M. D., Henry G. Moehring, M. D. and John R. Hannan, M. D. 764 pages 112 illustrations Charles C. Thomas Publisher Springfield Ill., 1956. Price \$24.50

This readable, clear, concise and beautifully illustrated volume is a worthy contribution to the literature. It is not designed for detailed study but rather for quick, balanced reference. If one desires to pursue any subject further, an adequate bibliography is provided at the close of each chapter.

The volume is free of padding or extraneous material and the approach to each subject is objective and concrete. The illustrations are superior reproductions of original radiograms with ample specific annotations. The brief but accurate references to embryology, anatomy and physiology serve to refresh the reader's memory with the application of these basic sciences to the pathologic condition under consideration.

In reviewing a book so replete with information it is difficult to appraise critically one section against another. Those sections dealing with the digestive and excretory tracts are impressive.

One of the most valuable aspects of this book is the frequent reference to differential diagnosis with the clinical and laboratory relationships. The choice of the title *Clinical Roentgenology* is good for no work has emphasized more clearly the role of the radiologist as a practicing physician.—ALLAN B. RAMSAY, Col MC, USA

**ATHLETIC INJURIES** Prevention, Diagnosis and Treatment by Augustus Thorndike M.D. 4th edition. 252 pages. 113 illustrations. Lea & Febiger Philadelphia Pa. 1956. Price \$4.50.

The purpose of this small monograph is to present the problem of the prevention, diagnosis and treatment of injuries received in American college sport. This edition includes new drawings to elucidate the technique of applying supportive strappings and bandages.

The first section of the book contains an interesting historical resume of the origin of medical supervision of college athletics and its results with a discussion on physical fitness and fatigue. The second section deals with the different types of trauma and their treatment. The author states "This chapter will not go into detail as to the proper methods of fracture therapy as many textbooks cover this field adequately." This applies equally to his discussion of other types of treatment which might be appropriately included in the preface. He does emphasize the necessity of open reduction of ankle fractures whenever restoration of the joint to normal cannot be accomplished by conservative methods.

The third section deals with each anatomical region and is probably intended as a reference. The author's thoughts on knee injuries are at variance with those of many others. Tabulating 356 injuries to the medial collateral ligament alone, he enumerates only nine cases in which such an injury was combined with injury to the anterior cruciate. His treatment of knee ligament sprains rightly emphasizes the prevention of quadriceps atrophy but denies the efficacy of plaster fixation or operation except in severe cases. However, he admits that cases treated in this manner always have a residual laxity of the ligament.

The illustrations of the techniques of applying supportive strappings are well done and lucid.—WILLIAM S. STRYKER, Capt MC, USN

**THE INITIAL MANAGEMENT OF THORACIC AND THORACO-ABDOMINAL TRAUMA** by *Laurence M. Skeets M D* A Monograph in The Bannertone Division of American Lectures in Surgery edited by *Michael E. DeBakey M D* and *R. Glen Spurling M D* Thoracic Surgery Division Editor *Brian B. Blades M D* 121 pages illustrated Charles C Thomas Publisher, Springfield Ill 1956. Price \$6.50

This short, well written monograph of 121 pages contains most of the essentials required for the management of thoracic and thoraco-abdominal trauma. The author, in addition to his vast personal experience in this field has quoted other equally experienced surgeons.

Particularly stimulating is the author's emphasis on adequate resuscitation before any ill advised major surgery is undertaken. Many such cases having been adequately resuscitated are found not to require operative interference. Along this line Dr Churchill's remarks in the foreword are very apropos concerning "panic decisions" and "stairpedes to the operating room" as well as "trigger happy surgeons".

The book is well illustrated and indexed. It is simply written in a concise manner appealing to the reader. As an excellent easily understood, quick reference on resuscitative rather than operative measures it should be available to all military medical officers and civilian physicians, particularly those who may be called upon to treat mass casualties. —**SANFORD W. FRENCH III Col MC USA**

**ROENTGEN SIGNS IN CLINICAL DIAGNOSIS** by *Isadore Meschan, M. A. M. D.* with the assistance of *R. M. F. Farrer-Meschan M. B. B. S.* 1 058 pages 2 216 illustrations on 780 figures W. B. Saunders Co Philadelphia Pa 1956. Price \$20

This text is written for medical students residents in radiology and practicing physicians. It presents the fundamentals of radiology rearranged on the basis of objective signs as seen in roentgenograms. The text is so organized that the limitations and accuracy in roentgen diagnosis are pointed up by demonstrating the technical and anatomic facets behind roentgen signs. It is organized to lead the reader to systematic thinking and analysis of roentgen signs prior to the formation of definitive diagnoses. The author uses this book along with his *Atlas of Normal Radiographic Anatomy* in his teaching of radiology.

There are hundreds of excellent roentgenograms and numerous line drawings point out details in the roentgenograms. References are kept to a minimum of key articles which will provide addition. Many of the chapters begin with an annotated review covered in the chapter. Since the author is a radiologist, in his field of radiology he must necessarily be an expert.

The book is easy to read concise and clear. It is a must for all radiology trainees and it will be a valuable addition to the radiologist's library. —**JOHN L. HATCH Col MC USA**



THE TREATMENT OF FRACTURES by Lorenz Böhler M D Volume I translated from the Thirteenth German Edition by Hans Teller Helen B Luchini Frank Kreuz Otto A Russe and Robert G B Bjornson 5th edition in English 1 072 pages 1 721 illustrations Grune & Stratton Inc New York N Y 1956 Price \$24 50

This monumental treatise which represents the first of three volumes follows the form used in previous editions on treatment equipment and reasons for failure While there is a considerable expansion of text and in x ray prints which are pertinent and clear examples of points discussed illustrations are often widely separated from the explanatory text

Approximately 280 pages are devoted to a general discussion of the treatment of trauma to soft and bony tissue There is discussed the organization of a fracture service and the x ray requirements and also a detailed discussion of essential pieces of apparatus, splints and special devices for treatment of fractures

There are many clear illustrations of excellent results obtained in the treatment of severe and complicated injuries of the extremities The discussion of fractures of the forearm is excellent however such statements as medullary nails should not be used will hardly be widely agreed with in this country at present Also the use of the Böhler clavicular "block splint as well as some of the devices for abduction treatment of upper extremity injuries although no doubt successful are not likely to become popular in American orthopedic practice

It is still felt by this reviewer that Doctor Böhler's greatest contributions to orthopedic practice are his valuable fundamental principles which are again frequently reiterated throughout the book as in previous editions 1) Slight shortening (over-riding) should always be the goal in order to insure union 2) Closed (simple) fractures should be treated by meticulous closed reduction avoiding open reduction unless critically necessary 3) Insertion of foreign bodies such as metallic fixation devices and unnecessary sutures should be avoided and skin only should be sutured in open (compound) fractures

The most serious criticism of this work is that throughout the book there is considerable repetition of statistics and experiences from the pre antibiotic period extending as far back as 1914 Granting that there is value in comparing treatment in that period with that at present it could be more appropriately condensed into a single short chapter for convenient reference

If one is a complete disciple of Böhler he will find much to delight him and little to criticize in this volume —WALTER R MILLER Capt MC USN

## New Books Received

Books received by the *U S Armed Forces Medical Journal* are acknowledged in this department. Those of greatest interest will be selected for review in a later issue.

- OPERATING ROOM TECHNIC** St Marys Hospital Rochester, Minn 5th edition 359 pages illustrated W B Saunders Co Philadelphia Pa 1957
- THE RECURRENT LARYNGEAL NERVES IN THYROID SURGERY**, by William H Rustad M D 47 pages illustrated Charles C Thomas Publisher, Springfield, Ill, 1956 Price \$4.50
- PSYCHIATRIC RESEARCH REPORTS 6** of the American Psychiatric Association "Application of Basic Science Techniques to Psychiatric Research" Edited by Members of the Committee on Research 1955-56 Jacques S Gottlieb, M D Chairman Papers presented at the Western Regional Research Conference Held Under the Joint Auspices of the American Psychiatric Association and the University of California School of Medicine, Department of Psychiatry and Medical Extension University Extension Los Angeles California, January 26-27 1956 211 pages, illustrated American Psychiatric Association, Washington, D C 1957 Single copies \$2 Orders should be addressed to Psychiatric Research Reports American Psychiatric Association 1785 Massachusetts Ave N W Washington 6 D C
- PRACTICAL DIAGNOSIS AND TREATMENT OF LIVER DISEASE** by Carroll Moton Levey M D Foreword by Franklin M Hanger M D Illustrations by Felix Traugott 336 pages 84 illustrations including 23 in full color Paul B Hoeber Inc Medical Book Department of Harper & Brothers, New York, N Y, 1957 Price \$8.50
- NOTES ON ATOMIC ENERGY FOR MEDICAL OFFICERS** by The Royal Naval Medical School Alverstoke Hampshire England 169 pages illustrated Philosophical Library Inc New York N Y 1956 Price \$4.75
- DISCUSSIONS ON CHILD DEVELOPMENT** A Consideration of the Biological Psychological and Cultural Approaches to the Understanding of Human Development and Behaviour, edited by J M Tanner M D Pb O DPM, and Bärbel Inhelder Volume I The Proceedings of the First Meeting of the World Health Organization Study Group on the Psychobiological Development of the Child Geneva 1953 240 pages illustrated Volume II The Proceedings of the Second Meeting of the World Health Organization Study Group on the Psychobiological Development of the Child London, 1954 270 pages illustrated International Universities Press, Inc, New York NY 1957 Price \$10 for set of two volumes
- OCCUPATIONAL THERAPY** Principles and Practice by William Rus Duntun Jr M D and Sidney Licht M D 2d edition 373 illustrated Charles C Thomas, Publisher Springfield Ill, 1957 \$8

THE TREATMENT OF FRACTURES by Lorenz Böhler M D Volume I translated from the Thirteenth German Edition by Hans Tretter Helen Luchini, Frank Kreuz Otto A Russe and Robert G B. Bjornson. edition in English 1 072 pages 1 721 illustrations Grune & Stratton Inc New York N Y 1956, Price \$24 50

This monumental treatise which represents the first of three volumes follows the form used in previous editions on treatment equipment and reasons for failure While there is a considerable expansion of text and in x ray prints which are pertinent and clear examples of points discussed illustrations are often widely separated from the explanatory text

Approximately 280 pages are devoted to a general discussion of the treatment of trauma in soft and bony tissue There is discussed the organization of a fracture service and the x ray requirements and also a detailed discussion of essential pieces of apparatus splints and special devices for treatment of fractures

There are many clear illustrations of excellent results obtained in the treatment of severe and complicated injuries of the extremities The discussion of fractures of the forearm is excellent however such statements as medullary nails should not be used will hardly be widely agreed with in this country at present Also the use of the Böhler clavicular "block" splint as well as some of the devices for abduction treatment of upper extremity injuries although no doubt successful are not likely to become popular in American orthopedic practice

It is still felt by this reviewer that Doctor Böhler's greatest contributions to orthopedic practice are his valuable fundamental principles which are again frequently reiterated throughout the book as in previous editions 1) Slight shortening (overriding) should always be the goal in order to insure union 2) Closed (simple) fractures should be treated by meticulous closed reduction avoiding open reduction unless critically necessary 3) Insertion of foreign bodies such as metallic fixation devices and unnecessary sutures should be avoided and skin only should be sutured in open (compound) fractures

The most serious criticism of this work is that throughout the book there is considerable repetition of statistics and experiences from the pre antibiotic period extending as far back as 1914 Granting that there is value in comparing treatment in that period with that at present it could be more appropriately condensed into a single short chapter for convenient reference

If one is a complete disciple of Böhler he will find much to delight in and little to criticize in this volume —WALTER R. MILLER Capt MC USN

## New Books Received

Books received by the *U S Armed Forces Medical Journal* are acknowledged in this department. Those of greatest interest will be selected for review in a later issue.

**OPERATING ROOM TECHNIC** St Marys Hospital Rochester Minn 5th edition 359 pages illustrated W B Saunders Co Philadelphia Pa 1957

**THE RECURRENT LARYNGEAL NERVES IN THYROID SURGERY** by William H Rustad M D 47 pages illustrated Charles C Thomas, Publisher Springfield, Ill, 1956 Price \$4.50

**PSYCHIATRIC RESEARCH REPORTS 6**, of the *American Psychiatric Association* "Application of Basic Science Techniques to Psychiatric Research" Edited by Members of the Committee on Research 1955-56 Jacques S Gottlieb M D Chairman Papers presented at the Western Regional Research Conference held under the joint auspices of the American Psychiatric Association and the University of California School of Medicine Department of Psychiatry and Medical Extension University Extension, Los Angeles California, January 26-27, 1956 211 pages illustrated American Psychiatric Association, Washington D C, 1957 Single copies \$2 Orders should be addressed to Psychiatric Research Reports American Psychiatric Association 1785 Massachusetts Ave N W, Washington 6, D C

**PRACTICAL DIAGNOSIS AND TREATMENT OF LIVER DISEASE** by Carroll Moton Leavy M D Foreword by Franklin M Hanger M D Illustrations by Felix Traugott 336 pages 84 illustrations, including 23 in full color Paul B Hoeber, Inc, Medical Book Department of Harper & Brothers, New York N Y 1957 Price \$8.50

**NOTES ON ATOMIC ENERGY FOR MEDICAL OFFICERS** by The Royal Naval Medical School Alverstoke Hampshire England 169 pages illustrated Philosophical Library, Inc, New York N Y 1956 Price \$4.75

**DISCUSSIONS ON CHILD DEVELOPMENT**, A Consideration of the Biological, Psychological and Cultural Approaches to the Understanding of Human Development and Behaviour edited by J M Tanner M D, Ph D, DPM and Barbel Inhelder Volume I The Proceedings of the First Meeting of the World Health Organization Study Group on the Psychobiological Development of the Child, Geneva 1953 240 pages illustrated Volume II The Proceedings of the Second Meeting of the World Health Organization Study Group on the Psychobiological Development of the Child London 1954 270 pages illustrated International Universities Press Inc New York N Y, 1957 Price \$10 volumes

**OCCUPATIONAL THERAPY Principles and Practice**, Dunton Jr M D and Sidney Licht M D 2d illustrated Charles C Thomas, Publisher \$8

- KLINISCHE FUNKTIONSDIAGNOSTIK** von Doz. Dr. Heinrich Kurbmeier unter Mitarbeit von Prof. Dr. W. Bolt, Föln, Prof. Dr. H. Goldeck, Hamburg, und Dr. H. Hamm, Hamburg mit einem Geleitwort von Prof. Dr. A. Jores, Hamburg. 411 Seiten mit 152 Abbildungen. Georg Thieme Verlag, Herdweg 63 (14a), Stuttgart, Germany, 1955.
- DIE LEBERKRANKHEITEN** Diagnostik und Therapie für die Praxis von Prof. Dr. Kurt Beckmann, Stuttgart, 1957. VIII, 253 Seiten, 74 zum Teil mehrfarbige Abbildungen. Georg Thieme Verlag, Herdweg 63 (14a), Stuttgart, Germany, DM 36. In the U S A and Canada: Intercontinental Medical Book Corporation, New York 16, N Y. Price \$8.60.
- DERMATOLOGIE DER MUNDHÖHLE UND DER MUNDUMGEBUNG** Systematik, Morphologie und Grundzüge der Behandlung von Aloys Greither, Dr. Med. et Dr. Phil. Mit einem Geleitwort von Prof. Dr. W. Schönfeld, Heidelberg. 262 Seiten mit 191 Abbildungen. Georg Thieme Verlag, Herdweg 63 (14a), Stuttgart, Germany, 1955.
- BORDERLANDS OF THE NORMAL AND EARLY PATHOLOGIC IN SKELETAL ROENTGENOLOGY** by Prof. Dr. Alban Köhler. 10th edition, completely revised with reference to illustrations and to text by Dozent Dr. E. A. Zimmer, Bern/Fribourg. English translation (from the 10th German edition) arranged and edited by James T. Case, M.D., D.M.R.E. (Cambridge). 723 pages, 1300 illustrations. Grune & Stratton, Inc., New York, N.Y., 1956. Price \$24.50.
- MODERN OPERATIVE SURGERY** in Two Volumes. Volume II, edited by the late G. Grey Turner, LL.D., D.Ch., M.S., F.R.C.S., F.R.A.C.S., and Lambert Charles Rogers, V.R.D., M.Sc., M.S., F.R.C.S., F.R.C.S.E., F.R.A.C.S., F.A.C.S., with a foreword by Sir Gordon Gordon-Taylor, K.B.E., C.B., M.A., LL.D., Sc.D., M.D., M.S., F.R.C.S., F.R.C.S.E., F.R.C.S.I., F.R.A.C.S., F.A.C.S., 4th edition, 2,614 pages, illustrated. Paul B. Hoeber, Inc., New York, N.Y., 1957. Price \$17.50.
- CLASSICS IN ARTERIAL HYPERTENSION** by Arthur Ruskin, M.D., F.A.C.P., American Lecture Series, Publication No. 290. A Monograph in The Bannerstone Division of American Lecture Series Classics in Science and Medicine, edited by Wikto W. Nowinski, Ph.D., Dr. Phil. Nat., 358 pages, illustrated. Charles C. Thomas, Publisher, Springfield, Ill., 1956. Price \$9.50.
- THE YEAR BOOK OF RADIOLOGY (1956-1957 Year Book Series)** Radiologic Diagnosis, edited by John Floyd Holt, M.D., and Fred Jenner Hodges, M.D.; Radiation Therapy, edited by Harold W. Jacox, M.D., and Morton M. Kligerman, M.D., 430 pages, illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1957. Price \$9.
- PEDIATRIC CARDIOLOGY** by Alexander S. Nadas, M.D., F.A.A.P., 587 pages, illustrated. W. B. Saunders Co., Philadelphia, Pa., 1957.
- MEDICAL DEPARTMENT, UNITED STATES ARMY** Surgery in World War II, Volume II, General Surgery, 417 pages, illustrated. Editor-in-Chief, Colonel John Boyd Coates, Jr., MC; Editor for General Surgery, Michael E. DeBakey, M.D.; Associate Editors, W. Philip Giddings, M.D., and Elizabeth W. McFetridge, M.A. Historical Unit, Army Medical Service, Office of the Surgeon General, Department of the Army, Washington 25, D.C., 1955. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C., Price \$4.25.
- CYTOLOGIC TECHNIQS** For Office and Clinic, by H. E. Nieburgs, M.D., 733 pages, illustrated. Grune & Stratton, Inc., New York, N.Y., 1956. Price \$7.75.

- MANUAL OF ANESTHESIOLOGY** For Residents and Medical Students by *Herman Schwartz M D S H Ngai, M D* and *E M Papper M D* American Lecture Series Publication No 298 A Monograph in The Bannetstone Division of American Lectures in Anesthesiology edited by *John Adriani M D* 170 pages illustrated Charles C Thomas Publisher Springfield Ill, 1957 Price \$1.25
- ADVANCES IN PEDIATRICS** Volume IX 1957 edited by *S Z Levine* 3 pages illustrated The Year Book Publishers Inc Chicago Ill 1957 Price \$9
- ANNALS OF THE NEW YORK ACADEMY OF SCIENCES** Volume 66 Pt 2 Pages 233-414 October 5 1956. Editor-in-Chief *Otto L St Whistlock* Natural Resistance to Infections \* 180 pages illustrated The New York Academy of Sciences New York N Y 1956 Price \$3.50
- ANALYTICAL PATHOLOGY** Treatises in the Perspective of Biology Chemistry and Physics edited by *Robert C Mellors M D Ph D* Foreword by *Eugene L Opie M D Sc D* 477 pages illustrated The Blakiston Division McGraw Hill Book Co Inc New York N Y 1957 Price \$17
- LYMPHATICS LYMPH AND LYMPHOID TISSUE** by *Joseph Mendel Yoffey D Sc, M D (Manc)* F R C S (Eng) and *Frederick Colin Courtice M A D Phil (Oxon)* D Sc (Sydney) F R A C S (Hon) 2d edition 310 pages illustrated Harvard University Press Cambridge Mass 1956 Price \$10
- PRACTITIONERS CONFERENCES** Held at The New York Hospital Cornell Medical Center Volume 5 edited by *Claude E Forkner M D F A C P* 396 pages Appleton-Century-Crofts Inc New York N Y 1957 Price \$6.75
- STRAIGHT TO THE HEART** A Personal Account of Thoughts and Feelings While Undergoing Heart Surgery by *George Lantor Ph D* 317 pages International Universities Press Inc New York N Y 1956 Price \$5
- HISTORY OF THE AMERICAN BOARD OF SURGERY 1937-1956** by *J Stuart Rodman M D* 104 pages J B Lippincott Co Philadelphia Pa 1956 Price \$3
- ACCEPTED DENTAL REMEDIES 1957** Including a List of Accepted Products Together With Other Information Compiled to Promote Rational Therapeutics in Dentistry revised by *Council on Dental Therapeutics of the American Dental Association* 22d edition 214 pages American Dental Association Chicago Ill 1957 Price \$2
- YOU AND YOUR OPERATION** by *Benjamin R Reiter M D* 150 pages illustrated The Macmillan Co New York N Y 1957 Price \$3.50
- MEDICAL DEPARTMENT UNITED STATES ARMY** Surgery in World War II Orthopedic Surgery in the European Theater of Operations 397 pages illustrated Editor in Chief *Colonel John Boyd Coates Jr, MC* Editor for Orthopedic Surgery *Mather Cleveland M D* Associate Editor *Elizabeth M. McFetridge M A* Historical Unit Army Medical Service Office of the Surgeon General Department of the Army Washington 25 D C 1956 For sale by the Superintendent of Documents U S Government Printing Office Washington 25 O C Price \$4
- PROBLEMS OF AGING** edited by *Robert L Craig M D* A Symposium presented at the Twenty Eighth Annual Graduate Fortnight of The New York Academy of Medicine October 10 to 21 1955 240 pages illustrated Paper cover Distributed by George Eliot Medical & Scientific Books 1302 Second Ave New York 21 N Y 1956 Price \$3.50

- LESIONS OF THE CERVICAL INTERVERTEBRAL DISC** by *R. Glen Spurling* M. D. American Lecture Series Publication No. 301. A Monograph in The Bannerstone Division of American Lectures in Surgery edited by *Michael E. DeBakey* M. D. and *R. Glen Spurling* M. D. Neurosurgery Division edited by *Barnes Woodhall* M. D. 134 pages illustrated Charles C. Thomas Publisher Springfield Ill., 1956. Price \$4.75
- CHILDREN'S EYE PROBLEMS** by *Emanuel Krinsky* M. D. 175 pages illustrated Grune & Stratton Inc. New York N. Y. 1956. Price \$6.
- A M. A. Scientific Exhibits 1956** Sponsored by Council on Scientific Assembly American Medical Association. 411 pages illustrated Grune & Stratton Inc. New York N. Y. 1956. Price \$10.
- THE TREATMENT OF FRACTURES** by *Loenz Bohler* M. D. Volume II translated from the 13th German edition by *Otto Russe* M. D. and *R. G. B. Bjornson* M. D. 5th edition in English. Pages 1073-1508. Chapters 49 to 74. 941 illustrations Grune & Stratton Inc. New York N. Y. 1957. Price \$17.50.
- A MATHEMATICAL GUIDE TO DOSAGE AND SOLUTIONS** by *Alice C. Cook* B. S. R. N. and *Katherine E. Davidson* B. S. R. N. 190 pages illustrated W. B. Saunders Co. Philadelphia Pa. 1957.
- THE PHYSICIAN WRITER'S BOOK** Tricks of the Trade of Medical Writing by *Richard M. Heurtt* M. D. 415 pages, illustrated W. B. Saunders Co. Philadelphia Pa. 1957.
- PEDIATRIC CLINICS OF NORTH AMERICA** Symposium on Respiratory Disorders February 1957. *Waldo E. Nelson* M. D. Consulting Editor. 321 pages illustrated W. B. Saunders Co. Philadelphia Pa. 1957.
- CLINICAL USE OF RADIOISOTOPES** by *William H. Brereton* M. D. *Philip C. Johnson* M. D. and *Arthur J. Solar* B. S. M. S. (Physics). 456 pages illustrated W. B. Saunders Co. Philadelphia Pa. 1957.
- LOCAL HEALTH ADMINISTRATION** by *Jack R. Ewalt* M. D. 168 pages Charles C. Thomas Publisher Springfield Ill. 1956. Price \$5.50.
- THORAX** Volume II No. 4 December 1956 edited for the Thoracic Society (President George Mason) by *N. R. Barrett* and *J. G. Scadding*. Pages 25-342 illustrated. Published by British Medical Association Tavistock Square London W. C. 1. England. Price \$7 yearly subscription (4 numbers) single numbers \$2.25.
- THE YEAR BOOK OF GENERAL SURGERY (1956-1957 Year Book Series)** edited by *Evarts A. Graham* A. B. M. D. with a section on Anesthesia edited by *Stuart C. Cullen* M. D. 647 pages illustrated The Year Book Publishers Inc. Chicago Ill. 1956. Price \$6.75.
- FUNDAMENTALS OF CLINICAL FLUOROSCOPY** With Essentials of Roentgen Interpretation by *Charles B. Storch* M. D. 2d revised edition. 305 pages illustrated Grune & Stratton Inc. New York N. Y. 1957. Price \$8.75.
- DISEASES OF THE HEART AND CIRCULATION** by *Paul Wood* O. B. E. M. D. (Melbourne) *F. R. C. P.* (London). 2d edition. 1,005 pages illustrated J. B. Lippincott Co. Philadelphia Pa. 1956. Price \$15.
- AMERICAN DRUG INDEX 1957** by *Charles O. Wilson* Ph. D. and *Tony Eveitt Jones* M. S. 650 pages J. B. Lippincott Co. Philadelphia Pa. 1956. Price \$5.

# UNITED STATES ARMED FORCES MEDICAL JOURNAL

*Published Monthly by  
the Armed Forces Medical Publication Agency  
Department of Defense*



*Editor*

CAPTAIN BENNETT F AVERY, MC, USN

*Associate Editors*

COLONEL ROBERT S ANDERSON, MC, USA

COLONEL PAUL V DAVIS, USAF (MC)

*Assistant Editor*

LIEUTENANT FRANKLIN M ROBERTS, MC, USNR

UNITED STATES  
GOVERNMENT PRINTING OFFICE  
WASHINGTON 1957



## Monthly Message

In November 1956 a two day meeting of the Joint Committee on Aviation Pathology was held with an attendance of over 100 military and civilian scientists, engineers and pathologists from the United States the United Kingdom and Canada

In a study of almost 300 gross autopsy reports it was demonstrated that fatal head injuries incurred in accidents during landing and takeoff procedures were often the only significant pathologic changes noted. This emphasizes a pathway of further study along preventive lines.

Study of the degree and location of burns is often most helpful to engineers and materiel experts in arriving, as to where the fire originated its intensity and duration.

A study of pathologic findings of 14 cases of death due to inflight decompression sickness demonstrated the need for further experimental work in this direction. Other developments centered about (1) the possibility of use of ultraviolet fluorescence and a potential role of infrared in the use of the electron microscope (2) studies in explosive decompression at high altitudes (3) attempts to devise a test on post mortem tissues to show the existence of ante mortem hypoxia (4) problems concerned with toxicology carbon dioxide fuels et cetera and (5) hyperventilation and hypoglycemia and pre existing disease.

These are some of the paths in research which come within the purview of this Committee in its important contribution to the prevention of airplane accidents.

*Frank B Berry*

FRANK B BERRY  
Assistant Secretary of Defense  
(Health and Medical)

## Table of Contents

Treatment of Pneumomediastinum With Increased Air Pressure— <i>John H Schulte</i> .....	469
Serious Heart Disease Simulated by Hiatus Hernia— <i>Eddy D Palmer</i> .....	477
Biliary Radiomanometry— <i>Max L. Smith and Manuel Santos</i> .....	481
Treatment of Anticholinesterase Poisoning by "Phospho Insecticides and Nerve Gas"— <i>Stephen Krop and Ted A. Loomis</i> .....	495
Personal Identification by Means of the Teeth— <i>Robert D Wyckoff</i> .....	500
Enuresis and Spina Bilida Occulta— <i>Shelton P Sanford and Gilbert W Altman</i> .....	507
Modified Marsupialization Operation for Pilonidal Sinus An Ambulatory Treatment Using Lidocaine as a Local Anesthesia— <i>Daniel J Abramson</i> .....	513
Cavity Preparation by Ultrasonic Versus Rotary Instrumentation In Vitro Cutting Effectiveness and Heat Production— <i>Jack L Hartley</i> .....	519
Reactions to Prophylactically Administered Penicillin A Study of Sixty Eight Hospitalized Patients— <i>Kenneth H Burdick</i> .....	528
The Isolation of Enteric Pathogens at Barrow Alaska— <i>Jack W Cullison and Thomas R A Davis</i> .....	534
Improving Predictability of Minnesota Multiphasic Personality Inventory— <i>Gerald J Briskin and James W Stennis</i> .....	539
CLINICOPATHOLOGIC CONFERENCE	
U S Naval Hospital Philadelphia Pa. ....	544
SERVICE ARTICLE	
Psychiatric Problems in U S Army Installations in Europe— <i>Howard P Rome</i> .....	554
CASE REPORTS	
Dubin Johnson Syndrome— <i>Arthur L Klatsky and Richard F Huck</i> .....	562
Constitutional Hepatic Dysfunction— <i>Nicholas H Zeller and Gerd Schleef</i> .....	568
Unique Renal Trauma— <i>Anthony A Borski</i> .....	573
Homozygous Hemoglobin C Disease Relation to Military Service— <i>Robert D Gens</i> .....	577
Mecanum ileus With Cystic Pancreatic Fibrosis and Early Pulmonary Complications— <i>Melvin E Jenkins and Evan W Shear</i> .....	581
Rupture of the Esophagus by Compressed Carbon Dioxide— <i>R Maurice Hood</i> .....	587
DEPARTMENTS	
A Message From the A M A .....	591

## DEPARTMENTS—Continued

Aero Medical Association Meeting .....	593
New Commanding Officer at Landstuhl Army Medical Center .....	594
Officers Certified by Specialty Boards .....	595
The James Stevens Simmons Memorial Professorship .....	598
Unusual Military Medicine Course .....	599
Army Medical Office Honored .....	600
National Industrial Health Conference .....	601
Death .....	602
Dental Association Official Visits Air Force Base .....	603
Correspondence .....	604
Air Force Nurse Awarded Legion of Merit .....	606

## BOOKS

Reviews of Recent Books .....	607
New Books Received .....	623

## Foreword

The *United States Armed Forces Medical Journal* is the medium for disseminating information of administrative and professional interest to all medical personnel of the Department of Defense. The Assistant Secretary of Defense (Health and Medical) and the Surgeon General of the several services invite all medical officers, dental officers, Medical Service Corps officers, Nurse Corps officers, and officers of the Veterinary Corps of the Armed Forces, and the medical consultants of the Army, Navy, and Air Force to submit manuscripts for publication in this journal.

FRANK B. BERRY, M.D.

*Assistant Secretary of Defense (Health and Medical)*

MAJOR GENERAL SILAS B. HAYS

*Surgeon General, United States Army*

REAR ADMIRAL BARTHOLOMEW W. HOGAN

*Surgeon General, United States Navy*

MAJOR GENERAL DAN C. OGLE

*Surgeon General, United States Air Force*

# UNITED STATES ARMED FORCES MEDICAL JOURNAL

Volume VIII

April 1957

Number 4

## TREATMENT OF PNEUMOMEDIASTINUM WITH INCREASED AIR PRESSURE

JOHN H. SCHULTE *Lieutenant Commander MC USA*

**P**NEUMOMEDIASTINUM was first described in 1819 by Lennec.<sup>1</sup> Since that time there has been a continual increase in knowledge concerning the pathogenesis, signs, symptoms, and differential diagnosis, but little advancement in the treatment of this condition. This article reports two cases of pneumomediastinum that were treated successfully with increased ambient air pressure, a method which has not been previously described in the literature for the treatment of this condition.

### PATHOGENESIS

Air may gain access into the mediastinum by one of five avenues: (1) directly into the mediastinum from perforation or surgical procedures on the upper respiratory system and esophagus, (2) dissection of air from the deep fascial planes of the neck, (3) dissection of air from the retroperitoneal space, (4) rupture of the alveoli into the pulmonary interstitial tissue, and (5) dissection of air from the deep fascial planes of the anterior abdominal wall during pneumoperitoneum.<sup>2</sup>

### SYMPTOMATOLOGY

The onset of symptoms varies from a few minutes to a few days. This may be of importance in the differential diagnosis from air embolism which is usually immediate. The development of convulsions, which may occur in air embolism, has never to my knowledge been reported in a case of pneumomediastinum.

From U. S. Naval Medical Research Laboratory, U. S. Naval Submarine Base, Groton, Conn. Comdr. Schulte is now at Pittsburgh Area Field Office, Atomic Energy Commission, Idaho Falls, Idaho.

The usual symptoms in this condition are substernal distress or fullness, sore throat, hoarseness, dysphagia, choking sensations, dyspnea, and varying degrees of respiratory embarrassment.

The physical examination may reveal cyanosis and subcutaneous emphysema of the neck, chest wall, and the abdomen. A tympanic percussion note may replace the normal substernal dullness. Distant heart sounds and a crunching sound synchronous with the heart beat (Hamman's sign) have been noted.

Roentgenograms of the chest reveal the presence of air in the fascial planes and in the mediastinum, especially in the oblique and lateral views. This may extend into the neck and be demonstrated in the roentgenograms of the neck. No characteristic electrocardiographic pattern is produced by pneumomediastinum.

### TREATMENT

Treatment has consisted of observation, bed rest, and symptomatic therapy in mild cases, with gradual resorption of the gas over a period of several days. In more severe cases, needle aspiration or catheterization and suction through the suprasternal notch or an intercostal space have been attempted to remove the excess gas from the tissue spaces.

### CASE REPORTS

**Case 1** A 25 year-old man began taking the routine pressure test in the recompression chamber as a preliminary part of his submarine escape training. During the application of pressure he experienced a great deal of difficulty equalizing the pressure in his middle ears.

The instructor in the chamber noticed that he used the Valsalva maneuver to maintain ear equalization and advised the man against using excessive force. The instructor stopped increasing pressure several times to allow the man to regain his equalization.

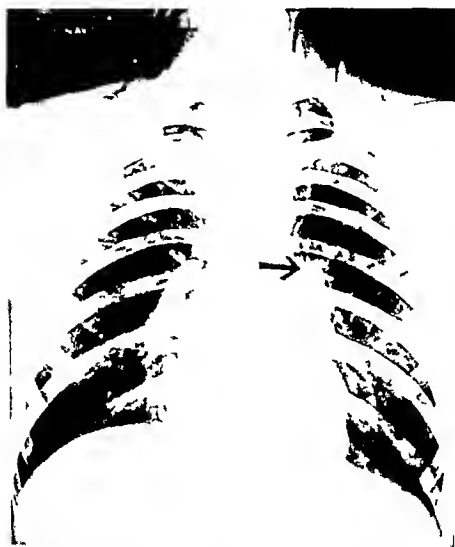
The required pressure (50 lb/sq in indicated gage pressure or 64.7 lb/sq in absolute pressure) was reached in seven and one half minutes. The man experienced no further difficulty and the pressure was released at the normal rate of 12 lb/sq in /min. Upon return to sea level pressure the man complained of pain in both ears, tinnitus, and soreness of the neck muscles.

Physical examination revealed crepitation in the anterior cervical triangles and a grade 3 acrotitis medii (Teed's classification) bilaterally. No other physical abnormalities were found.

The patient was put at bed rest under observation. Four hours later his symptoms had subsided and he was allowed to return to his home. He was instructed to call the escape training tank officer immediately upon any change in his condition.

Early the same evening he called the training tank officer complaining of soreness in the neck, difficulty in breathing, tightness in the chest, and inability to swallow anything other than liquids. He also noticed that his voice had become deeper in pitch. He stated that the symptoms had developed slowly and progressively since leaving the pressure chamber that morning.

Upon physical examination he appeared moderately apprehensive but in no acute distress. His blood pressure was 110/95 mm Hg, pulse 120



*Figure 1 (case 1) Posteroanterior view of the chest demonstrating free air in the mediastinum and extending into the neck.*

weak, slightly irregular, and thready, and respiration rapid and shallow. There was palpable crepitation throughout both anterior cervical triangles. The ears revealed a grade 3 aerotitis media bilaterally. There was minimal injection of the posterior pharynx. Examination of the chest

revealed normal lung fields. The precordium and the mediastinum were tympanic to percussion. Heart sounds were irregular and distant becoming inaudible when the patient leaned forward. Roentgenograms revealed air in the mediastinum and extending into the neck (figs 1 and 2).

The man was placed in the recompression chamber and pressure treatment was begun. At 14 lb/sq in indicated gage pressure he stated the tightness in his chest was somewhat relieved. Physical examination revealed no appreciable change in the physical findings.



Figure 2 (case 1) Oblique view of the chest. Note large bubble of air in the subcutaneous tissue over the left clavicle.

Recompression was continued until 44.5 lb/sq in indicated gage pressure was reached. The patient stated that he had complete relief of symptoms. His voice had returned to its normal pitch.

Physical examination revealed a blood pressure of 125/65 mm Hg and a regular pulse with a rate of 92/min. Percussion of the chest revealed

normal mediastinal and precordial dullness. The heart sounds were good and regular. Some crepitation still persisted in the neck.

Recompression was continued to 75 lb/sq. in indicated gage pressure and treatment in accordance with Navy treatment tables begun. Upon reaching atmospheric pressure (0 lb/sq. in gage pressure) approximately 20 hours later, the man was completely asymptomatic except for some muscle soreness in the anterior neck muscles. Physical examination was negative except for a slight amount of crepitus over the



*Figure 3 (case 1) Posteroanterior view of the chest immediately after treatment showing complete resorption of the air in the tissues*

sternocleidomastoid muscles. He was transferred to the infirmary for 24 hours' observation.

Upon discharge from the infirmary he was asymptomatic. Physical examination was completely negative. Roentgenograms of the chest and



neck revealed complete resorption of gas and an electrocardiogram revealed no evidence of cardiac damage (fig 3)

Case 2 A 24 year old man developed mild chest pain while making simulated submarine "free" escapes from depths of 18 and 50 feet (8 and 14 lb/sq in gage pressures respectively) in the submarine escape training tank

During the afternoon the discomfort continued but did not incapacitate him from playing a round of golf By evening the man noted substernal fullness mild dyspnea dysphagia hoarseness deepening of the voice and pain in the neck on motion in any direction



Figure 4 (case 2) Lateral view of the neck showing a mass in the posterior pharyngeal wall extending into the superior mediastinum

Physical examination revealed a white male of stated age in no apparent distress. His blood pressure was 110/75 mm Hg, pulse, 72 full and regular, respiration, 20/min, and somewhat cogwheel.

There was resistance and pain in the neck on movement of the head. A small area of crepitation was noted at the medial edge of the right sternocleidomastoid muscle. There was moderate congestion of the nasal mucosa, posterior pharynx, larynx, vocal cords, and epiglottis. The chest was clear to palpation, percussion, and auscultation. Roentgenograms revealed air in the retropharyngeal space extending into the mediastinum (fig. 4).

The man was placed in the recompression chamber and pressure treatment was begun. Upon reaching 75 lb/sq in gage pressure the patient was completely relieved of his symptoms and his voice had returned to normal. The crepitus noted on previous physical examination had completely disappeared. There was no limitation of motion in the head or neck. Treatment was carried out in accordance with the standard Navy treatment tables.<sup>5</sup>

After completion of treatment the man remained asymptomatic and physical examination was completely negative. He was transferred to the infirmary for observation. Twenty-four hours later he was returned to duty. Roentgenograms of the chest and neck demonstrated complete resorption of the air.

### DISCUSSION

Rupture of the alveoli allowing air to enter the pulmonary interstitial tissue is the probable cause for the development of pneumomediastinum in both of these men.

The first man ruptured his alveoli by using the Valsalva maneuver too forcefully while attempting to equalize pressure in his middle ears during a pressure test. The second man apparently allowed the air pressure in his chest to exceed the outside water pressure while ascending through the water when making simulated submarine escapes.

Peabody and Buechner<sup>2</sup> demonstrated in dogs that rupture of the alveoli allowed air to dissect along the perivascular and peribronchial interstitial tissue into the mediastinum. The air entered the interstitial tissue during inspiration and was slowly milked toward the mediastinum during expiration. This explains the gradual onset and progressive increase in symptoms typical of this type of pneumomediastinum.

The use of increased ambient air pressure is standard practice in decompression sickness (bends) and in air embolism in divers.<sup>6,7</sup> The rationale for using increased pressure is that bubbles in tissues will be more rapidly reduced in size.

plication of 75 lb/sq in gage pressure (6 atmospheres absolute) reduces the size of a gas bubble to one sixth its original volume thus allowing a more rapid reabsorption of gas into the body fluids and elimination through the lungs

The interstitial gas bubble in the mediastinum will respond to increased pressure in the same manner as the intracellular gas bubbles of decompression sickness or the intravascular gas bubbles of air embolism. It can therefore be expected that pneumomediastinum will respond well to this form of therapy

#### SUMMARY

The treatment of pneumomediastinum has in the past been primarily symptomatic. In severe cases attempts were made to aspirate the air through the suprasternal notch or an intercostal space.

Two patients with clinical and roentgenologic evidence of pneumomediastinum who were treated by exposing them to increased ambient air pressure which was then gradually reduced made rapid and complete recoveries. One patient had developed the pneumomediastinum when he performed a forceful Valsalva maneuver while being subjected to a routine pressure test in the recompression chamber as a part of his submarine escape training. The other patient had developed it while making simulated "free" escapes in the submarine escape training tank.

This method of treating pneumomediastinum has not been reported previously in literature. Its degree of success and the rate of recovery are far superior to results obtained with older for

# SERIOUS HEART DISEASE SIMULATED BY HIATUS HERNIA

EDDY D PALMER *Lieutenant Colonel MC USA*

**D**URING management of 214 patients with the direct or "sliding" type of hiatus hernia, 11 were encountered who presented the classical symptoms of angina pectoris and three who showed the classical manifestations of acute myocardial infarction. Several other patients with more complicated clinical pictures had complaints that suggested coronary artery disease in addition to various forms of dyspepsia.

The problem which patients of this category create concerns much more than mere differentiation of heart disease from hiatus hernia. Some patients clearly have both, without apparent causal association, as did nine of the 214. Others appear to show significant coronary artery repercussions resulting from some form of autonomic reflex sparked by the activities of the displaced gastric sac. It has not been possible to date to define the degree of influence that the one organ may have over the other during various physiologic and pathophysiologic activities, because animal experiments are clearly not applicable to the human and because among humans there appears to be a very wide individual variation in coronary artery response to visceral stimulation.

The present report is concerned only with clinical differentiation of heart disease from hiatus hernia. The importance of the differentiation needs no emphasis, but it is worth noting that the 11 patients who had been carrying the diagnosis of coronary insufficiency had been needlessly living the restricted and frightened lives of angina pectoris patients for an average of more than eight months. Following are brief reports on a typical case of hiatus hernia mimicking coronary insufficiency and on the three instances of misdiagnosed infarction.

## CASE REPORTS

**Case 1** This 45 year old medical officer was engaged in moving heavy equipment during the invasion of Normandy in 1944 when he was seized by a constricting pain deep in the chest with aching radiation down

---

From 2d General Hospital, APO 180 New York N Y

his left arm. An electrocardiogram made five hours later was found to be normal and he returned to his arduous duties. He was in active combat for a month before he was studied in any detail. Meanwhile he had four recurrences either during physical strain or during meals. Detailed cardiac studies were normal but a small hiatus hernia was discovered. The diagnosis of coronary insufficiency was nevertheless made, and he was eventually separated from the Army by disability retirement. During the next three years he had many recurrences of the same type of pain lasting 2 to 10 minutes at a time and clearing spontaneously with rest. He found that on only some occasions would prescribed nitroglycerin help. Three times he vomited small amounts of bright blood, this being the only overt gastro-intestinal symptom. Hospitalization and restudy on three further occasions led to confirmation of the diagnosis of coronary insufficiency. Now upon the current hospitalization the cardiologist was not able to find any heart disease nor from the previous records could he confirm the previous diagnosis. A hiatus hernia was again found roentgenologically and esophagogoscopic examination showed moderate subacute erosive esophagitis. The esophagogastric junction lay 2 cm proximal to the hiatus. The hernia was repaired surgically. During the 15 month follow-up period there were no further pain recurrences.

**Case 2.** This 54 year-old white man previously well was awakened one night by a severe crushing pain over the middle of the chest anteriorly. It cleared spontaneously after about two minutes but during the next morning it returned four times while he was at rest becoming progressively more sustained. It was accompanied by a smothering sensation. He was hospitalized with the diagnosis of myocardial infarction. Physical examination revealed a frightened patient who was sweating and exhibiting moderate tachycardia. There was no cyanosis and the respirations were quiet and easy. The blood pressure, heart, lungs, and abdomen appeared to be normal. Subsequent studies showed repeatedly normal electrocardiograms, sedimentation rate, white blood cell count, roentgenograms of the chest, and temperature. Contrast fluoroscopy revealed a small direct hiatus hernia and esophagoscopic study confirmed the diagnosis and demonstrated complicating erosive esophagitis. Medical management was decided upon for the moment but because of a recurrence two months later surgical repair was accomplished. Reevaluation 13 months later showed that there had been no further pain or other complaint.

**Case 3.** During a period of 13 years this 43 year old white man had six episodes of bursting epigastric pain rising through the chest to the neck, jaw, eyes, shoulders, and arms. On two occasions the pain had been accompanied by sweating, hypotension, unconsciousness, and incontinence. The attacks had appeared in an entirely unpredictable fashion without relationship to any activity. They lasted from one half to two hours. The patient had been hospitalized on each occasion and treated at the outset as a case of myocardial infarction.

Some of the records were available now during the current hospitalization. The long series of electrocardiograms showed no abnormalities except for temporary ischemic changes over a five day period three years previously. A 2 cm hiatus hernia had been demonstrated on two occasions. Surgical correction was now recommended but the patient would accept no more than a trial phrenic crush, having been convinced that he had serious heart disease. After three asymptomatic months, he thought that the point had been proved and underwent hiatal repair.

**Case 4.** This 64 year-old hypertensive woman who had complained of pyrosis for several years was awakened one night by severe heavy substernal and epigastric pain. She felt as though she were being smothered and found it difficult to get her breath. Because she lived alone, she was not able to get help. Upon attempting to rise she fainted briefly and broke out in a cold sweat. After seven hours the pain gradually went away and she was able to go to the hospital. The history revealed two previous spells of similar but briefer and milder pain during the previous five months. The second time she was hospitalized for six weeks and discharged with the diagnosis of myocardial infarction. Admission examination now revealed only fear, tiredness and moderate hypertension. All routine and special cardiac studies were otherwise normal but a small hiatus hernia was found by roentgenographic and esophagoscopic study. The hernia was repaired surgically. Postal reports to the present 21 months later have indicated that there has been no further pain.

#### COMMENT

It is not being suggested that it is an onerous matter to avoid mistakes like this but rather that, because not all substernal pain is heart pain, failure of objective studies to confirm the clinical impression of heart disease necessitates reevaluation of the whole problem. The most disturbing attitude to be found in this situation is that the most serious possible diagnosis must be accepted as the working diagnosis because of the potential consequences of an error in the other direction. Much depends, quite naturally, on the clinician's individual subspecialty orientation or his special interests. The previous clinical records of the present group of patients contained many references to the clinician's insecurity over the normal or slightly abnormal electrocardiographic and other studies. Often this was covered by a statement to the effect that the best cardiologic teachings indicate that electrocardiographic abnormalities do not always occur in instances of overt coronary artery disease, even when there is infarction, and that, regardless, the clinical impression must take precedence over objective testing methods. A substantial misleading factor in the cases of "angina pectoris" was the therapeutic test of symptomatic response to nitroglycerin. It

appears to be a poorly recognized fact that the pain of hiatus hernia, as well as that of several types of esophageal dyskinesia responds rather well to the nitrites. No comfort regarding the diagnosis of coronary insufficiency should be taken from the results of such a therapeutic regimen.

One of the important considerations in all dealings with the symptomatology of hiatus hernia is that, as a rule, the smaller a hiatus hernia is the more severe are the subjective manifestations. The hernias among the present group of 14 patients were 2 to 3 cm in extent but no larger. The hernias in some of the other patients in the whole series were very much larger but among them the symptoms included no sudden or severe pains. Quite naturally, the smaller a hiatus hernia is the more difficult the diagnosis is to establish—and the more difficult it is to convince one's surgical colleagues that repair is indicated.

It is an important error to assume that a normal upper gastrointestinal x ray series excludes the diagnosis of hiatus hernia. Not only must the radiologist use special techniques if he is to demonstrate the lesion but also in many cases the herniation is an intermittent affair spontaneously undergoing reduction which cannot be quickly reproduced on the fluoroscopy table. Among the 214 cases, a single roentgenographic series demonstrated the lesion in only 78 per cent and repeated studies in only 85 per cent. The results of esophagoscopy were a little better the figures being 85 and 88 per cent respectively but the important point is that both examination techniques are required before the possibility of hiatus hernia can reasonably be excluded.

#### SUMMARY AND CONCLUSION

Seven per cent of 214 patients with direct hiatus hernia presented the classical symptomatology of either coronary artery insufficiency or myocardial infarction and were treated for variable periods of time as cardiac patients. The most important error involved in addition to lack of awareness over the cardiac mimicking potentialities of hiatus hernia, was failure to accept the normal results of objective studies because the clinical features of heart disease seemed so evident. Hiatus hernia is not always an easy diagnosis to establish, and this is an especially important consideration when it comes to differentiation from coronary artery disease for the smaller a hiatus hernia is the more likely it is to cause severe chest pain.

# BILIARY RADIOMANOMETRY

MAX L. SMITH *Lieutenant Colonel MC USA*

MANUEL SANTOS M D

**B**ILIARY radiomanometry is really a refinement of cholangiography. It is a diagnostic technic in which pressure readings and contrast roentgen studies are done simultaneously. Both of these technics have been used separately for a long time, but it is their rather recent combination into one study that makes the technic more valuable.

Since the days of Oddi,<sup>1</sup> manometric studies have been made in which water, bile, and mercury were used as perfusing agents. These have contributed greatly to our knowledge of the physiology of the biliary tracts. Mirizzi<sup>2,3</sup> proposed the use of routine operative cholangiography. This simple method gives excellent morphologic images of the bile ducts, but there may be abnormalities of the two sphincter areas which are not detectable by the hand or eye of the surgeon or by a single picture of the bile ducts which have been filled with opaque liquid. These abnormalities can only be detected by the slight variations of pressure which are necessary to permit fluid to pass these zones.

During the past 25 years of the more or less widespread use of cholangiography, the results of biliary surgery have failed to be entirely satisfactory. Great emphasis has been placed on the detection of stones, but the functional and the combined functional organic disorders of the biliary apparatus have remained largely unsolved. Many studies of the late results after biliary surgery indicate the need for a better diagnostic method, both preoperatively and during surgical intervention.

Sendwiese and Fulton,<sup>4</sup> in analyzing a series of patients who had undergone cholecystectomy for cholelithiasis, found moderate to severe symptoms persisting in 10 to 25 per cent. When the procedure was carried out for the noncalculous gallbladder, the number of patients having symptoms increased to 50 per cent. Schildt<sup>5</sup> reviewed a group of 500 patients who underwent biliary surgery between 1950 and 1952 and found that only 70 per cent were symptom free. In 1952, Coleman and Bonnett<sup>6</sup> found 68 occurrences of symptoms in 487 cholecystectomies.

---

From Walter Reed Army Hospital, Washington, D. C. Dr. Santos was Official Observer at this hospital from Universidad de Chile (Catedra Prof. Velasco S.).



Reports after surgery on the common duct also indicate that there is a need for better diagnosis and treatment. Preston and Alden<sup>7</sup> analyzed 74 postoperative cholangiograms made through an indwelling T tube after common duct surgery and found normal common ducts in only 56.7 per cent, stones in the common duct in 24.3 per cent, and partial or complete obstruction of the distal third of the common duct in the remaining 19 per cent. The reported incidence of residual common duct calculi ranges from 2 to 33 per cent.<sup>8</sup>

Biliary radiomanometry fills some gaps in the interpretation of the roentgen films taken without fluoroscopy, because the curves of biliary pressures obtained give information which is in many ways equivalent to that found on a fluoroscopic examination.

Caroli and Maurv<sup>9</sup> in 1937 were the first to use this combined technic in which multiple views of the dye-filled biliary ducts were taken at different pressures. This technic has been varied and perfected by numerous surgeons abroad, particularly by Mallet Guy,<sup>10</sup> Albot, Olivier, and Libaudo<sup>11</sup> and Kapandji.<sup>12</sup>

The principle of this technic is simple and consists of a graduated glass tube manometer being connected to a source of radiopaque dye and to the patient's biliary tree, either the gallbladder or the common duct. This apparatus, together with conveniently arranged x-ray equipment, is designed to take several views of the biliary system while the radiopaque material runs from the perfusion system under controlled pressures.

#### APPARATUS AND METHODS

The apparatus we use is similar to that described by Jacques Caroli<sup>13</sup> (fig. 1). It consists of a glass flask of approximately 150 ml capacity which contains the contrast media. This flask is connected to a 20-ml syringe which contains a constant level of fluid in the syringe, irrespective of the rate of perfusion. Thirty-five per cent Diodrast solution (brand of iodopyracet) may be used as the contrast media. The syringe is connected to a glass manometer and to the patient's biliary tract by a Y tube. The perfusing system, consisting of the glass flask and the syringe, is held rigidly together and can be raised or lowered as the pressure is increased or decreased. The glass tube manometer should be approximately 75 cm long and 8 mm in diameter. The centimeter markings should be clearly visible for a distance of several feet. The apparatus may be connected to a kymograph to permit the recording on a graph of the variations of pressures during the exploration.

The rubber tubing connecting the various parts of the apparatus should be heavy enough to prevent kinking and have at least an 8 mm diameter to prevent significant capillary action. A zero point on the patient is established at the level of the biliary ducts. For



*Figure 1 Manometric apparatus in use in the operating room.*

practical purposes this may be considered to be midway in the trunk between the anterior and posterior abdominal walls. Zero point on the manometer and the fluid level in the syringe of the perfusing apparatus must be brought to the same level of the bile duct being investigated before beginning the study. All air bubbles should be removed from the tubing before the studies are begun to avoid producing radiolucent defects in the bile ducts (fig 2). If the gallbladder is being studied, it is most convenient to introduce a corrugated needle which can be tied in position with a purse string suture. If the common duct is being investigated, it is convenient to introduce through the cystic duct a curved cannula similar to the one devised by Mallot Guy (fig 3). In the absence of these two pieces of apparatus, other types of catheter or plastic tubing may be used.

The use of morphine preoperatively should be avoided. The patient is placed on a flat box on the operating table, and general anesthesia given. The box has an opening at the head of the table through which the cassettes can be very readily positioned and removed. This avoids the necessity for getting under the drapes for each x-ray exposure. A scout film is taken to check the position of the cassette and the quality of the film before surgical intervention is begun. The radiomanometric study should be done with minimal manipulation of the biliary tree.

Biliary manometry of the gallbladder is only worthwhile when no obvious pathologic disorder is found on inspection or palpation.

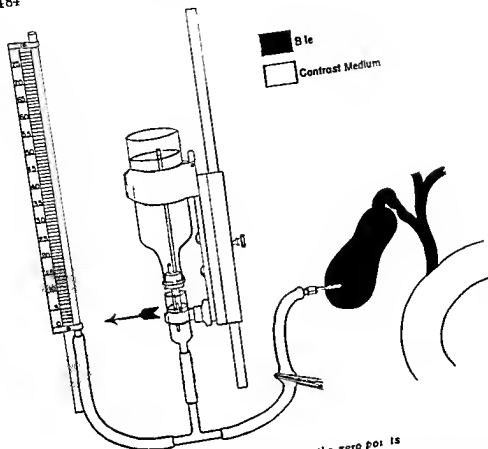
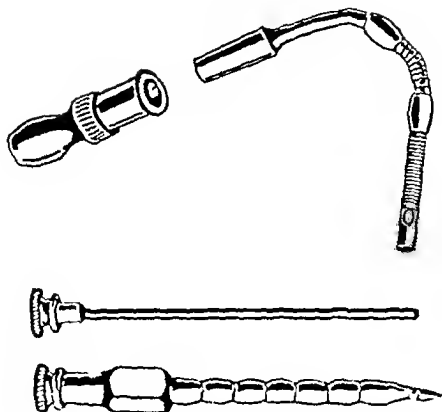


Figure 2. Establishing the zero point

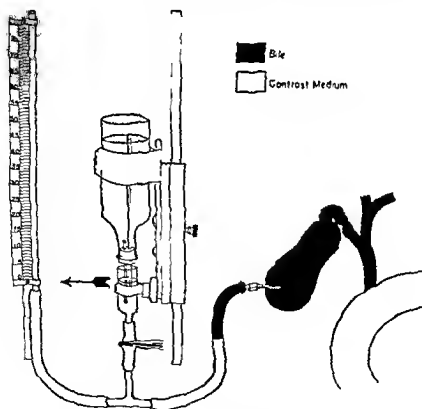
of the gallbladder. In the presence of gross pathologic disease in the gallbladder the cystic duct should be exposed and cannulated for a study of the common duct before the gallbladder is removed.

#### PRESSURE DETERMINATIONS

The first pressure to be determined in the gallbladder is the *initial intracavitary pressure* which represents the hydrostatic pressure present in the biliary system before any interference. With the apparatus at zero level the cannula is inserted without spilling bile. The perfusion system is clamped off. Bile will be seen in the transparent system leading from the gallbladder, and the rise in the fluid level in the manometer is noted. This intracavitary pressure in the gallbladder is normally about 6 to 8 cm of Diodrast. The determination of this pressure is important in order to compare it with the pressure necessary to open the sphincter mechanism. When studying intracavitary pressure in the common duct a special needle which can be inserted directly into the duct without spilling the bile is needed (fig. 4).



*Figure 3 Mallet Guy's cannula for use through the cystic duct and his needle for direct puncture of the gallbladder*



*Figure 4 Determining the intracavitary pressure*

At this point in the procedure, the tube leading from the perfusing syringe is opened and the apparatus is raised a few centimeters at a time to determine the pressure required to open the sphincter. The tube is clamped after every elevation. At a certain point the fluid level in the manometer will suddenly drop indicating that the dye has passed through the cystic duct, if the gall bladder is being studied, or through the sphincter of Oddi, if the common duct is being studied. This is called the *transit pressure* and should normally be in the vicinity of 10 to 15 cm in the gall bladder and 9 to 11 cm in the common duct (fig 5)

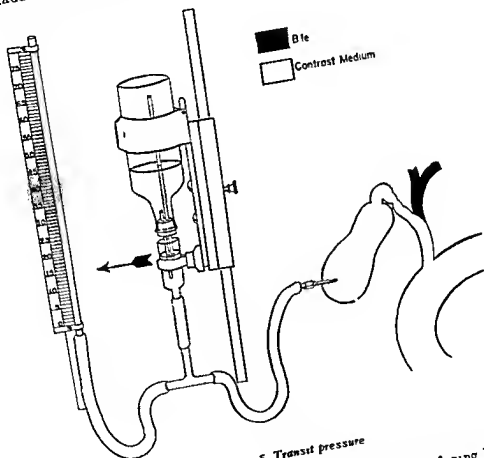


Figure 5 Transit pressure

The clamp is left on the tube leading from the perfusing bottle. After several minutes the fluid level in the manometer will stabilize at a point normally about 4 to 5 cm below the transit pressure of the cystic duct and 2 to 3 cm below that of the common duct. This represents the *residual pressure* (fig 6). These two pressures, the *transit* and *residual*, should be repeated two or three times and films taken at each pressure.

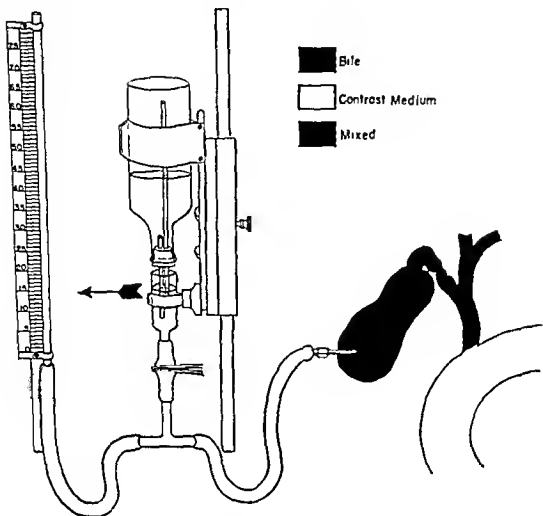


Figure 6 Residual pressure

Under normal conditions the transit pressure of the common duct must be lower than that of the cystic duct, otherwise emptying of the gallbladder would produce hypertension in the common duct. The pressures first described are the ones we have recorded during operations. Other investigators have made these studies preoperatively by transhepatovesicular puncture<sup>12</sup> or postoperatively through a cholecystostomy or T tube.

#### DISCUSSION

Biliary radiomanometrics has been used by its originators to study the sphincter systems of the gallbladder and the common duct in patients who have been subjected to intubations of these organs. Reactions to drugs and various stimuli have been determined by this technique. The physiologic individuality of the gallbladder sphincter as a neuromuscular apparatus of the gallbladder neck and cystic duct has been established.

Morphine has a more pronounced action on the gallbladder sphincter than on the common duct sphincter. It may throw the

At this point in the procedure, the tube leading from the perfusing syringe is opened and the apparatus is raised a few centimeters at a time to determine the pressure required to open the sphincter. The tube is clamped after every elevation. At a certain point the fluid level in the manometer will suddenly drop indicating that the dye has passed through the cystic duct, if the gall bladder is being studied, or through the sphincter of Oddi, if the common duct is being studied. This is called the *transit pressure* and should normally be in the vicinity of 10 to 15 cm in the gall bladder and 9 to 11 cm in the common duct (fig 5)

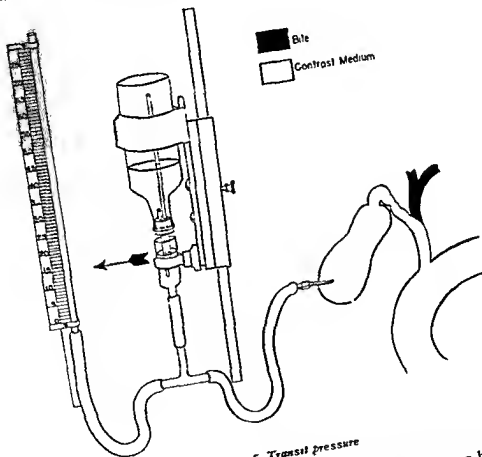


Figure 5 Transit pressure

The clamp is left on the tube leading from the perfusing bottle. After several minutes the fluid level in the manometer will stabilize at a point normally about 4 to 5 cm below the transit pressure of the cystic duct and 2 to 3 cm below that of the common duct. This represents the *residual pressure* (fig 6). These two pressures—the *transit* and *residual*, should be repeated two or three times and films taken at each pressure.

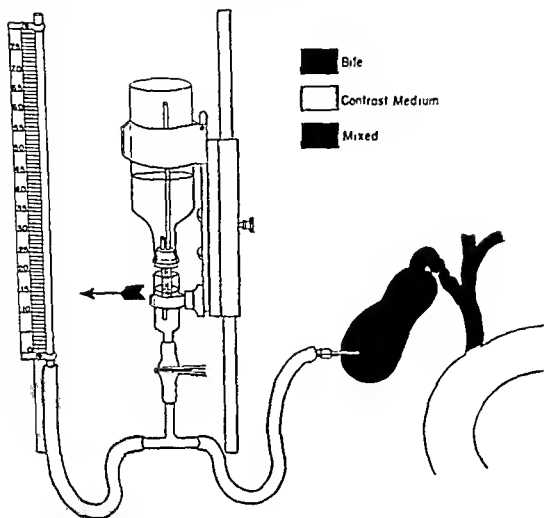


Figure 6 Residual pressure

Under normal conditions the transit pressure of the common duct must be lower than that of the cystic duct, otherwise emptying of the gallbladder would produce hypertension in the common duct. The pressures first described are the ones we have recorded during operations. Other investigators have made these studies preoperatively by transhepatovesicular puncture<sup>12</sup> or postoperatively through a cholecystostomy or T tube.

#### DISCUSSION

Biliary radiomanometrics has been used by its originators to study the sphincter systems of the gallbladder and the common duct in patients who have been subjected to intubations of these organs. Reactions to drugs and various stimuli have been determined by this technic. The physiologic individuality of the gallbladder sphincter as a neuromuscular apparatus of the gallbladder neck and cystic duct has been established.

Morphine has a more pronounced action on the gallbladder sphincter than on the common duct sphincter. It may throw the



whole gallbladder sphincter mechanism or isolated parts of it into spasm. It produces a tonic spasm of the wall of the second portion of the duodenum and the common duct sphincter. While morphine causes a contraction of the gallbladder sphincter, muscular area alone a fatty meal will throw the entire gallbladder and its sphincter apparatus into spasm.

Amyl nitrite suppresses functional spasm of muscle tissue in the gallbladder sphincter area. Through its action on the smooth muscle it relaxes the sphincter of the common duct and the entire duodenum in less than two minutes. Atropine produces a paralytic dilation of the wall of the second portion of the duodenum and releases the sphincter of the distal common duct. It has the same effect on the gallbladder sphincter. Atropine and amyl nitrite are very useful in differentiating organic from spasmodic stenosis in these areas.

By radiomanometric study of the Meltzer Lyon test, Caroll<sup>11</sup> concluded that the results depend on (1) an acceleration of the bile flow from the liver, (2) relaxation of the duodenal wall, the sphincter of Oddi, and of the gallbladder, and (3) slight to moderate contracture of the gallbladder. This test does not depend on the integrity of the sphincter of Oddi, inasmuch as the same train of events occurs if there has been a choledochoduodenostomy.

Debouvri<sup>12</sup> in his thesis stated that he had never observed a pharmacodynamic action of a drug on the common duct opening that was not the same on the wall of the duodenum.

Biliary radiomanometrics has achieved its greatest usefulness in elucidating the functional and organofunctional disorders of the biliary apparatus. Those syndromes although long suspected could not be accurately delineated by simple cholangiography. Chronic noncalculous cholecystitis is the general term used to include these disorders which have been variously called "cholecystatonia," "irritable gallbladder," "intolerant gallbladder," et cetera. By means of the radiomanometric test the French authors have been able to group the different functional diseases of the biliary tract into three entities: the hypotonias, the hypertonias, and the hyperesthesias.

By this technique it has been possible to show that "strawberry gallbladder" or "lipoidosis of the gallbladder" is an entity that starts as a chronic inflammatory lesion of the cystic duct which later gradually involves the neck and body of the gallbladder. The condition is shown by manometric evidence of partial obstruction and a climbing residual pressure.

#### ABNORMAL RADIOANOMETRIC FINDINGS

Obstruction of the cystic duct may be partial or total. It may be impossible to produce passage of dye through the cystic duct with

pressures up to 50 cm of 35 per cent Diodrast solution. If this is functional, it will be overcome in a few seconds with inhalation of amyl nitrite. If amyl nitrite has no effect, it is an indication of an organic lesion. Because this is not usually evident on inspection or palpation, we must rely on this test to indicate that a normal appearing gallbladder should be removed.

If transit through the cystic duct is accomplished, but only at an abnormally high pressure, and this is not relieved by inhalation of amyl nitrite, a partial organic obstruction may be assumed to exist. This is also an indication for cholecystectomy. The cystic duct, if studied microscopically, will demonstrate the presence of an organic lesion.

### CASE REPORTS

**Case 1** A 44 year old man with several years' history of alcoholism, upper abdominal pain, nausea and vomiting had a subtotal gastrectomy for postbulbar duodenal ulcer in November 1953. He was not helped by this operation. Serum amylase determinations made subsequent to this operation were elevated. On 1 April 1956 an exploratory operation was performed and a diagnosis of chronic recurrent pancreatitis made. The gallbladder was thin-walled and no abnormality was felt on palpation or inspection of the gallbladder or cystic duct. There were several large nodes about the common duct and a localized induration in the head of the pancreas. Manometric studies of the gallbladder with 35 per cent Diodrast solution repeated twice gave a transit pressure of 35 cm and a residual pressure of about 34 centimeters. There was almost imperceptible passage of dye through the cystic duct. Transit and residual pressures of the common duct were also elevated, and a transduodenal sphincterotomy was performed.

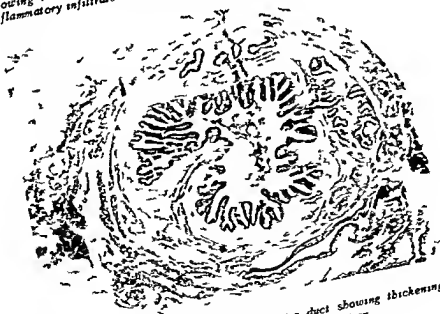
**Pathologic findings** Microscopic study (hematoxylin and eosin stain) of a biopsy specimen of the gallbladder wall showed markedly dilated Rokitsky Aschoff sinuses and minimal chronic inflammatory infiltrate (fig. 7). Cross section of the cystic duct showed thickening of the wall and chronic inflammatory reaction (fig. 8).

**Comment** Obstruction of the common duct may be complete or partial, as in the cystic duct, and the same tests with amyl nitrite will differentiate functional disturbances. Radiomanometric examination of this area will help reduce the 50 per cent postcholecystectomy disease seen after removal of the noncalculous gallbladder. It is much easier to overlook pathology in the common duct than in the gallbladder when relying only on inspection and palpation.

A raising of the transit pressure above normal may be the only clue to a disorder of the lower common duct if on repeated determinations of residual pressure it is found to be higher on each reading. The syndrome is recognized as the climbing of residual pressure of the common duct. This is usually seen



Figure 7 (case 1) Hematoxylin-eosin stained section of gallbladder wall showing markedly dilated Rokitsansky-Ascoboff sinuses and minimal chronic inflammatory infiltrate



(Figure 8 (case 1) Cross section of cystic duct showing thickening of the wall and chronic inflammatory reaction.

irregularities or inflammation of the sphincter of Oddi and the surrounding duodenum. Residual odditis is one of the most frequent and poorly understood causes of complications after cholecystectomy or choledochotomy for lithiasis. When slight hypertension of the sphincter of Oddi is confirmed, even in the face of normal appearing cholangiograms, the common duct should be decompressed by drainage or sphincterotomy.

**Case 2.** A 66 year-old woman had a cholecystectomy in January 1956 because of nonvisualization of the gallbladder and recurring epigastric pain. This was reported pathologically as normal. She was admitted in June with slight jaundice. An exploratory operation was performed on 31 July. No cystic duct stump remained. The common duct and pancreas were normal to palpation and inspection. Manometric readings of the common duct were slightly elevated. The initial transit pressure was 15 cm of 35 per cent Diodrast solution. The residual pressure was 13 centimeters. On repeated readings these rose to 20 and 18 respectively. Five cholangiograms, taken at various pressures, revealed only abnormal injection of the hepatic radicles. The common duct was not particularly enlarged and dye appeared in the duodenum. The duodenum was opened and a sclerotic, partly stenosed papilla was incised.

**Histologic findings.** Histologic examination of a biopsy specimen from the papilla showed a chronic inflammatory reaction with scarring involving the common bile duct and the immediate duodenal mucosa.

**Comment.** If the hepatic radicles or the duct of Wirsung are filled under a normal pressure of from 10 to 15 cm, some degree of obstruction at the papilla of Vater is suggested.

Cattell<sup>14</sup> stated that he and his associates surgically explored the common duct in 35 to 45 per cent of all gallbladder cases in order to avoid overlooked stones. Routine use of radiomanometric study of the common duct through the cystic duct should provide more exact indications for surgical attack on the common duct.

The value of this technic of preoperative common duct radio manometry over the methods of inspection, palpation, simple cholangiography, and surgical exploration of the common duct, available to surgeons today, is typified in the experience of Vallet-Guy.<sup>15</sup> In order to evaluate this procedure he surgically explored 100 common ducts containing stones. After the common duct had been opened, explored, and the stones removed, radiomanometric studies were made on these ducts. By this procedure 12 were found to still contain undetected stones or fragments. Two showed compression by pancreatitis. Five contained noncalculous obstruction. Twenty-two presented hypertonic reactions of the sphincter, some of which may have been the result of instrumentation. Causes for fistula and postoperative recurrence were thereby reduced.

Surgeons who have done cholangiograms at the time of operation have been dissatisfied with them, because they have not been reliable in disclosing stones. If multiple exposures are made at various pressures, stones are much less likely to be overlooked.

We have found this study useful when done postoperatively through an indwelling T tube. The finding of normal intracavitary pressures and free flow of dye into the duodenum with relatively normal resistance and without evidence of calculi or other obstruction gives one practical assurance that removal of the T tube will not be followed by fistula or cholangitis. The following two cases are illustrative.

**Case 3.** A 59-year old man was admitted on 13 August 1956 with acute cholecystitis of two days' duration. He had had no previous symptoms of gallbladder disease. The acute symptoms subsided rapidly on conservative therapy. He was given clearance by the medical service on the basis of his hypertensive cardiovascular disease secondary to generalized arteriosclerosis. Three efforts at oral and intravenous cholecystography were unsuccessful. Serum bilirubin was 1.8 mg per 100 ml, all of which was direct. An exploratory operation was performed on 31 August and a subacutely inflamed abscessed gallbladder containing many calculi was removed. The common duct was dilated and explored. No stones were found. A Bakes dilator No. 9 was passed through the sphincter into the duodenum without difficulty. A T tube was inserted. On 5 September the T tube was clamped but had to be released because of copious drainage around the tube. On 12 September the patient was taken to the fluoroscopic room where his common duct was studied by radiomanometric technique. Intracavitary pressure was found to be 9 cm of 35 per cent Diodrast. Transit pressure was 15 cm and at this point dye flowed freely into the duodenum. Residual pressure was consistently 11 cm. Cholangiograms made at this time were negative for calculi. The T tube was clamped for four days without incident and then removed. No further bile leakage occurred. The wound healed promptly and the patient was discharged shortly in an asymptomatic condition.

**Case 4.** A 78 year old man was admitted 17 October 1956 with acute cholecystitis of one day's duration. He had had no previous symptoms of gallbladder disease. He had had several transurethral resections for carcinoma of the prostate and had been on estrogen therapy for several years. Within two days after admission he became clinically jaundiced and his condition deteriorated making exploration mandatory. A cholecystostomy was performed and four ounces of calculi were removed from the acutely inflamed gallbladder. Without manometric control dye was injected into the common duct through the cystic duct. No dye entered the duodenum and there was suggestive evidence of common duct calculi. The common duct was opened and two calculi recovered. A T tube was inserted and again a cholangiogram was done with moderate but unmeasured pressure through a syringe. The common duct was apparently normal but no dye passed into the duodenum. Because of his precarious condition at this time further surgery was not attempted and

he was returned to his room with a cholecystostomy tube and a common duct T-tube in place. His jaundice cleared and recovery was uneven but Eleven days after the operation he was taken to the fluoroscopic room and studied by radiomnometric technique. The intracavitary pressure was found to be 5 cm of 35 per cent Diodrast. At 15 cm of pressure the common duct outlined well and dye flowed freely into the duodenum. Residual pressure was consistently between 10 and 11 cm. The biliary tree was clear of calculi. Both tubes were clamped off for six days and then removed. There was no further drainage and cholangitis did not develop. The patient was discharged within a few days without complaint.

Even though the transit and residual pressures were slightly elevated in these two patients, the evidence of free flow through the distal common duct and the several cholangiograms made during the study assure us that the tubes could be removed safely. It is likely that the severity of the acute inflammation and the trauma incident to the surgery explains these slightly elevated readings.

It seems that this technique represents an aid to the surgeon by reassuring him during the operation. It also assures the patient accurate and curative treatment at the proper time.

#### SUMMARY

The many unsatisfactory results following surgery of the biliary tract indicate that the presently used diagnostic methods are inadequate. The technique of radiomnometrics in which pressure readings and contrast roentgen studies are made simultaneously at the time of surgical intervention has been described. The apparatus, the method, and some of the normal and abnormal findings have been outlined. This technique represents a refinement of simple cholangiography and if routinely used, the incidence of postoperative biliary sequelae should be reduced. It is of great value in elucidating organic, functional, and mixed syndromes of the biliary tree.

#### REFERENCES

- 1 Oddi R. Sull'insufficienza della sfinctere del colidoco. *Arch per le Sc Med.* 12: 338 1888.
- 2 Mirizzi P L. El lipido-diagnostico en las obstrucciones no calculosas de las vias biliares principales. *Rev med. del Rosario* 20: 407-414 Sept 1930.
- 3 Mirizzi P L. Operative cholangiography. *Surg Gynec & Obst* 63: 702-710 Nov 1937.
- 4 Sandweiss D J and Fuston H. Intravenous cholangiography: results in 100 cholecystectomized patients with upper abdominal symptoms. *J A. M. A.* 159: 998-1001 Nov 5 1954.
- 5 Schildt E Sr. Results of surgical treatment of gallstone disease follow-up investigation. *Acta Soc med. upsal* 60: 17-29 Apr 15 1955.
- 6 Coleman E P and Bennett D A. Postcholecystectomy syndrome treated by vagotomy. *J Internat Coll Surgeons* 17: 861-871 June 1952.

- 7 Preston D J and Aldeo J W Jr Incidence of common bile duct disease following surgical exploration *Delaware M J* 27 32-38 Feb 1955
- 8 Singleton O A Jr and Coleman J L Residual common duct calculi *Ann Surg* 143 619-627 May 1956
- 9 Caroli J and Maury P Etude clinique et pathogénique des angiocholites ictériques importées d'Indonésie radiopneumodode *Paris med* 1 441-447 May 15 1937
- 10 Millot-Guy P Value of peroperative manometric and roentgenographic examination in diagnosis of pathologic changes and functional disturbances of biliary tract *Surg Gynec & Obst* 94 385-395 Apr 1952
- 11 Albot G Olivier C and Lihaut H Radiomanometric examination of biliary ducts experience with 418 cases *Gastroenterology* 24 242-261 June 1953
- 12 Kapadji M Le syndrome radiomanométrique de profil des dyskinésies de la voie biliaire accessoire individualisée par la radiomanométrie par ponction transpariétale pré-opératoire *Arch mal app digest* 40 601-627 1951
- 13 Caroli J La radiomanométrie biliaire *Semaine d'obst Paris* 22 1985-2000 Nov 21 1946
- 14 Debouvy J P *Radiomanométrie biliaire (contribution à la physiopathologie des voies biliaires)* Thèse pour le doctorat en médecine Presses Universitaires de France Paris 1941
- 15 Cartell R B Discussion in reference 8 pp 626-627

### CONFIDENCE

Confidence is an infectious thing—the doctor who possesses it is the doctor who can give it to others. It must be sincere. It is not much use pretending you are sure when you are not—the patient can tell. Confidence is invaluable because if you are certain you are right and if you can convince the patient that you are right then whether you really are right or not often makes very little difference. Yet the doctor should not assume omniscience. I have a notion that doctors do not often enough say "I do not know." It is better to tell a man confidently that you don't know than to tell him unconvincingly that you do. Patients can appreciate sincerity and truthfulness more than some people realize.

—RICHARD ASHER M D  
in *Lancet*  
p 760 Apr 9 1955

# TREATMENT OF ANTICHOLINESTERASE POISONING BY PHOSPHATE INSECTICIDES AND "NERVE GAS"

STEPHEN KROP Ph D  
TED A LOOMIS Captain, MC USAR

THE advent of potent anticholinesterase compounds as insecticides and the possibility that some member of this broad group of chemicals might be used in war as "nerve gas" present the medical practitioner with an urgent treatment problem in cases of severe poisoning which he otherwise sees only in such emergencies as severe cyanide or carbon monoxide, or aconite poisoning, severance of the carotid artery or acute bilateral pneumothorax. Some of these compounds such as diisopropyl phosphorofluoridate (DFP), triethyl phosphorite (TEPP), paranitrophenyl diethyl thionophosphate, etc., have a degree of toxicity exceeded by few other chemicals. They may cause death in a very few minutes after contact, ingestion, or inhalation of a very small amount. They occur so rapidly, primary reliance for treatment must be placed on the general medical principles which apply. These agents are used as insecticides or in a limited number of civilian populations. Therefore, it may be useful to review the known major actions of these compounds in order to assist the physician with the principles of treatment.

These compounds are, in the main, liquids of high boiling point, having little or no odor, exerting no irritation on the skin, eye, or respiratory tract in liquid or vapor form, thus providing no simple warning of exposure. Hence, their great toxicity and insidiousness render them highly dangerous.

## MODE OF ACTION

The only clearly defined biochemical lesion resulting from the action of these compounds is the long lasting inactivation of cholinesterases<sup>1-3, 7-11</sup> which normally destroy acetylcholine



The body "neurohormone" acetylcholine is believed to be intimately associated with impulse formation and propagation in nervous tissue and at the neuromuscular junction, with smooth muscle activity, with secretory activity of many glands and with the regulation of the cardiovascular system. For convenience in understanding the aims of treatment the effects of these poisons may therefore be regarded as those of acetylcholine: i.e. stimulation of the cholinergic portions of the autonomic nervous system and stimulation and paralysis of the central nervous system and of the neuromuscular apparatus. Acetylcholine effects have also been termed "muscarinic" and "nicotinic" (Other actions of anticholinesterase compounds have been reported but they probably are not significant from the standpoint of therapy.) From these considerations the actions of these compounds may be deduced or explained.

### SYMPTOMATOLOGY

There are considerable variations in relative prominence of groups of symptoms, in time of onset and greatest severity of symptoms and in time to death as illustrated by the rapid acting sarin and TEPP on the one hand and the slow acting parathion, on the other. However in each case it is possible to regard the symptoms as arising from a common cause and to consider the problem of treatment as fundamentally the same for all members of this class of poisons.

On the basis mainly of observations in animals the following symptoms can be expected to appear in rapid succession after severe exposure to sarin or TEPP: rhinorrhea, salivation and miosis, difficulty in breathing followed by cyanosis, collapse, and convulsions, sweating, urination and defecation, paralysis of respiration with extreme cyanosis. The pulse may be slow or absent and blood pressure low after an initial elevation. Heart block, partial or complete, may accompany the low heart rate which may persist until death. Widespread or localized twitching of skeletal musculature and subsequent persistent weakness appear. A severe case of anticholinesterase poisoning will present itself as one of acute asphyxia. On the other hand these symptoms appear and develop more slowly in parathion poisoning.

It is obvious that not all of the symptoms enumerated must be controlled to ensure survival. For example, sweating and miosis will not cause death but interference with respiration at any point between nostril or mouth and the tissues may be lethal. Hence this action of the anticholinesterases is the central problem in the treatment of the severely poisoned. The symptoms of primary lifesaving importance are those arising from the action of these compounds on organ systems whose failure results in

asphyxia The means by which body tissues are assured of an adequate oxygen supply may be regarded as follows

1 Those concerned with ventilating the pulmonary alveoli The anticholinesterases act to increase the resistance of the lung to inflation (bronchoconstriction),<sup>17-20</sup> obstruct the upper airway by secretions,<sup>1,24</sup> interfere with the operation of the respiratory center by convulsions<sup>21,22</sup> and by paralysis,<sup>21,22</sup> and interpose neuromuscular block to the muscles of respiration<sup>23</sup>

2 Those concerned with delivering oxygenated blood from the lungs to the tissues In anticholinesterase poisoning propulsion of blood to the tissues is hindered or lost by the slowing or arrest of the heart<sup>23,24,25</sup> and by increased resistance in the pulmonary circuit<sup>23</sup> Such action may explain acute collapse

Therefore, the therapeutic challenge is to combat the effects of anoxia Effective respiration must be maintained, and cardiovascular support must be provided

### TREATMENT

Further absorption of the poison obviously must be prevented by removal of the casualty from the poisoned atmosphere, masking, washing the skin and eye, or gastric lavage—whichever is indicated by circumstances of the exposure Oropharyngeal secretions must also be cleared However, in view of the rapidity with which symptoms may become serious, as already indicated, treatment must be instituted without delay

Drug treatment of anticholinesterase poisoning may logically be approached by (1) chemical destruction or inactivation of the poison already in the body, (2) reactivation of the cholinesterase and destruction of the poison, and/or (3) blocking the effects of acetylcholine Important progress has been made in the direction of (1) and (2) by study of the action of certain hydroxamic acids in vitro and in vivo<sup>24, 26, 27</sup> However, the important element of time is yet to be satisfactorily overcome in these approaches since the hydroxamic acids act too slowly for practical usefulness and, for destruction or inactivation of the poison, must be given prophylactically to be effective \* Blocking the actions of acetylcholine with atropine, however, meets the time requirement for successful treatment, for its action is almost instantaneous after absorption and is of suitable duration Except for the neuromuscular action of acetylcholine, the actions of the anticholin

---

Similar compounds such as 2 pyridine aldoxime methiodide (PAM) reported after this paper was submitted for publication suffer from the same fundamental limitation In fact recent observations by one of us (T A L. to be published) indicate that PAM is ineffective as an antidote in experimental sarin poisoning Therefore no change in the conclusion of the present paper that atropine is the backbone of drug therapy of severe anticholinesterase poisoning is indicated at this time

esterases having life or death importance are controllable to an important extent by atropine by its known anticholinergic action in the central nervous system smooth muscle glands and circulation<sup>24 25</sup> Similarly atropine readily prevents or reverses the actions of the anticholinesterases<sup>17-23 27 28</sup> and by itself exerts considerable lifesaving action if given early enough and in sufficient dosage in cases of severe poisoning<sup>2 6 27 28</sup>

Artificial respiration will be necessary in all cases where respiratory embarrassment or failure exists. Positive pressure ventilation will be needed if the airway resistance is increased. Although atropine in feasible dosage does not effect the neuromuscular block exerted by the anticholinesterase compounds it makes possible the successful application of artificial respiration by erasing the lung impedance to ventilation by controlling airway secretions, by relieving the cardiovascular effects, and by controlling convulsions<sup>19 20 22</sup> It also hastens recovery of the respiratory center<sup>21 22</sup> and spinal reflexes<sup>16</sup> It should be noted that convulsions will impede artificial respiration and may prevent intravenous therapy

The toxicity of atropine is low,<sup>29 30</sup> considering its high anticholinergic potency, and in severe anticholinesterase poisoning the dosage of atropine may need to be quite high by comparison with doses used for other purposes<sup>1-6 11</sup> In the past treatment failures in severe insecticide poisonings have been due to too little atropine given too late. In general it must be given repeatedly in doses sufficient to control the effects on respiration and circulation or sufficient to maintain a mild degree of overdosage (dryness of the mouth and skin). The initial dose should be 2 mg of atropine sulfate or tartrate intramuscularly, repeated as the clinical condition indicates. The chief drawback to atropine is its interference with sweating, an important avenue of heat loss from the body in warm climates this must be carefully observed<sup>11 12 14</sup> Other drugs possessing the desirable properties of atropine to an improved extent and with greater lifesaving potency are being sought and some have shown promise<sup>1-6 14</sup> but their possibilities all factors considered are yet to be established. In the meantime, reliance on atropine for drug therapy of anticholinesterase poisoning must continue.

#### REFERENCES

- 1 Special Article Lancet 263 286 (1952)
- 2 Grob D Lilenthal J W Harvey A M Jones E F Langworthy O R and Tibbo S A Bull. Johns Hopkins Hosp 81 217 (1947)
- 3 Grubb D Ann Int Med 32 1229 (1950)
- 4 Grubb D and Harvey A M Am J Med 14 53 (1953)
- 5 Freeman G and Epstein M A Chemical Corps Medical Laboratories Research Report No 340 1955
- 6 Freeman G Ludemann H Cornblith M Gold A Fibert M Udall J and Cugell D Chemical Corps Medical Laboratories Research Report No 303 1954

- 7 Wood J R J A M A. 144 606 (1950)
- 8 *Ibid.* 145 1267 (1951)
- 9 Adriaao E D Feldberg W and Kilby B A Brit J Pharmacol & Exper Therap 2 56 (1947)
- 10 Mazur A and Bodansky D J Biol Chem 163 261 (1946)
- 11 Augustinsson K B Acta physiol Scandinau 1948 vol 15 supplement 52 p 1
- 12 DuBois K P Doull J Saleroo P R and Coon J M J Pharmacol & Exper Therap 95 79 (1949)
- 13 Salerno P R and Crow J M *ibid* 95 240 (1949)
- 14 Summerson W H Armed Forces Chem J 9 24 (1955)
- 15 Michel H and Krop S J Biol Chem 190 119 (1951)
- 16 Wills J H Personal communication 1955
- 17 Holmstedt B Acta physiol Scandinau 1951 vol 25 Supplement 90 p 7
- 18 deCandole C A Douglas W W Evans C L Holmes R Spencer K E V Tortance H W and Wilson K M Brit J Pharmacol & Chemotherapy 8 466 (1953)
- 19 Krop S and Kunkel A M Proc Soc Exper Biol & Med 86 530 (1954)
- 20 Ainsworth M Personal communication
- 21 Marazzi Personal communication
- 22 Holmes R Personal communication
- 23 Daly M de B Personal communication
- 24 Davies D R J Pharmacy & Pharmacol 6 1 (1954)
- 25 Wilson I B and Meisblich E K J Am Chem Soc 75 4629 (1953)
- 26 Calma I and Wright S J Physiol 103 93 (1944)
- 27 Modell W Krop S Hitchcock P and Riker W F J Pharmacol & Exper Therap 87 400 (1946)
- 28 Modell W and Krop S *ibid* 88 34 (1946)
- 29 Clements J A. Am J Physiol 179 626 (1954)
- 30 Goddoo A S J A M A. In press
- 31 Cullumbine H and Miles S Personal communication
- 32 Chemical Corps Medical Laboratories Field Therapy Committee First Aid and Treatment of Severe Nerve Gas Casualties Oct 1954
- 33 Craig F N J Applied Physiol 4 826 (1952)
- 34 Robinson S Chemical Corps Medical Laboratories Contract Report No 15 1953

---

"Gastrointestinal bleeding may occur following small doses of aspirin with little or no demonstrable change in the prothrombin concentration of the blood"

—J J KELLY Jr M D  
in *American Journal of Medical Sciences* p 119 Aug 1956

# PERSONAL IDENTIFICATION BY MEANS OF THE TEETH

ROBERT D WYCKOFF *Captain DC USN*

**T**HE determination of personal identity is the recognition of an individual by characteristics which distinguish that one person from all others.<sup>1</sup> Fingerprints are considered the best means of identification because they have characteristics in great variety, have individuality, do not change throughout life, and can be accurately recorded.

Although the teeth have individuality and possess a great variety of characteristics that can be accurately recorded, the dental record must be kept up to date if it is to be accurate throughout life because of changes in the dentition caused by extractions, dental prosthesis, operative dentistry, or accidents. For this reason, and because cases in which fingerprints are not available are relatively few, the teeth have not received popular acclaim as a means of identification. If complete and currently accurate dental records are available, the teeth provide an excellent and in some cases, the only means of identification. Without an accurate record for comparison, however, the teeth alone become merely clues which may assist in identification only by giving evidence of age and race.

Teeth have been used as a means of establishing identity for several hundred years,<sup>2</sup> but this method is not likely to be used to any great extent in the civilian population unless dental records are made on the entire population and changes that have occurred in the dentition recorded at least once every two years. Ideally, there would be a coding system and the records would be kept on file in a central agency, such as the Federal Bureau of Investigation. The feasibility of such a system is questionable when the number of probable cases is compared with the cost. Although civilian dentists keep accurate records in many instances, they record only the treatments rendered. This, along with the shifting nature of our population, usually results in the non-

---

<sup>1</sup> Presented in a Symposium on The Human Dentition in Forensic Medicine at the meeting of the American Association for the Advancement of Science, Hotel Statler, New York, N.Y., 29 December 1956.

<sup>2</sup> From Dental Division, Bureau of Medicine and Surgery, Department of the Navy, Washington, D.C.

availability of complete records for use by the civilian investigator

### FACTORS ENABLING IDENTIFICATION

There are two principal factors which make the teeth unique as an aid to determining personal identity.<sup>3</sup> The first is the indestructibility of the crowns of the teeth, their supporting bony structures, and the restorative materials that are used by the dental profession. In cases of extreme mutilation by fire, force, or submersion, the teeth often provide the only evidence upon which identification can be made. The enamel of the crowns is approximately 95 per cent mineral, is almost completely resistant to deterioration by air, earth, or water, and is damaged or destroyed only by extremely high heat, exceptionally great mechanical forces, or chemical agents. The materials used in restorative dentistry are even more resistant. Commonly used gold alloys melt in the range of 1,600° to 2,000°f. The porcelain of bridges and artificial dentures is resistant to temperatures up to 2,000°f and the nonprecious metals that are used in the fabrication of partial dentures have even a higher melting point. Without this quality of resistance of the enamel and restorative materials to fire, the identification of many air crash victims would be impossible.

The second factor which makes the teeth a unique means of identification is the extreme improbability of there ever being two persons with identical sets of teeth. Even in the "perfect" dentition, shape and size of the arch and mold and shade of the teeth, as well as spacing and anatomical imperfections, make identical sets unlikely. On the Navy Dental Record there is a space for remarks that is used to record identifying characteristics other than missing teeth, caries, and restorations. Dental officers are instructed to give special attention to recording the identifying characteristics of the perfect dentition. In most cases, however, the dentitions have missing teeth, caries, and restorations in various combinations, none of which are alike.

### RELIABILITY

The unlikelihood of identical dentitions is evident from the number of combinations which are possible with 32 teeth. From the formula  $2^n - 1$  it is found that possible combinations number over four billion. If the five surfaces of each tooth and the possibility of different types of restorations were calculated, the astronomical figure resulting would make it obvious that there is almost no chance of two dentitions being alike and that if the chart of an unknown matches that of a known, even though not completely, there is no doubt that the charts were made from the same dentition (fig. 1).

Identification of an unknown by means of a dental record could be compared to a prediction that he has certain dental characteristics. It is doubtful that one could predict without previous knowledge of his dentition that a certain individual had, for example, a mesio occlusal amalgam in the lower right second molar in combination with a distal silicate on an upper lateral incisor and a mesio occlusal amalgam on the upper left second bicuspid. These are three frequently occurring artificial character

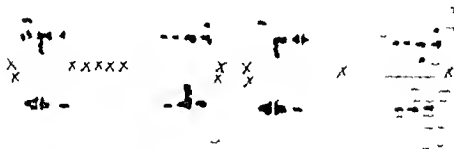


Figure 1 In October 1956 a naval officer was killed when his car went over a 400 foot cliff by the ocean. The car was buried by a landslide and when it was found after 10 days there was no body in the vicinity. Thirty days later an unidentified body washed up on the beach eight miles from the site of the accident. The chart above (left) was made from the dentition of the body. It was determined by the Navy dental record (right) that the body was that of the missing naval officer. Inasmuch as the officer had access to vital top secret information his disappearance had caused concern and a great desire to learn his true fate. (The markings on the dental charts are restorations. X indicates missing teeth.)

istics, but to guess three out of three would be highly improbable because the number of tooth surface combinations in a complete dentition is equal to  $1435 \times 10^{47}$ . Therefore if the prediction is made from a dental record that these characteristics should exist and it is subsequently found that they do the individual is positively identified.

The value of the teeth for determining the personal identity of casualties caused by fire, drowning and battle has been proved many times in the armed services. Even in peacetime the hazards of sea and air present a frequent requirement for identification by means of the dental record. This is made easier in the case of military personnel by supporting evidence such as (1) authoritative knowledge of the geographic location of all personnel (2) daily muster of personnel making it virtually impossible for the absence of a person to go unnoticed and (3) information usually available that the casualty to be identified may be a certain person or one of a certain group.

## METHOD

Upon entry into the Navy or Marine Corps each person receives a dental examination, and all missing teeth, existing restorations, dental caries, and abnormalities are recorded in duplicate on Standard Form 603—Dental Record. The original record accompanies the individual throughout his career and each dental treatment is entered on his record as it occurs. The duplicate record is sent to the Bureau of Medicine and Surgery in Washington, D C, where it remains until the member is separated from the service. At that time the original and duplicate records are sent to the Naval Records Management Center, St. Louis, Mo., for permanent filing. The number of records on file in St. Louis is over nine million, and from this source assistance has been rendered to civilian authorities in identifying the unrecognizable remains of persons known to have served in the Navy or Marine Corps (figs 2 and 3). The permanency of these records is protected—an Act of Congress would be required to have them destroyed.

When the personal identity of Navy or Marine Corps personnel must be determined by means of the teeth, requests for assistance are directed to the Dental Division of the Bureau of Medicine and Surgery. Assistance may be given in several ways, depending upon the requirements of the situation. If the original dental record is not available at the activity or aboard the ship to which the deceased was attached, a record may be made from his teeth and transmitted to the Bureau for comparison with the duplicate record, or else the recordings of the duplicate dental record may be transmitted from the Bureau to the activity or ship. Dental records within the United States can best be transmitted by telephone. When a record is required at an overseas base or aboard a ship it is sent by dispatch, however, where multiple records are required the dispatch becomes so long and cumbersome that errors in transmission may result. Mailing of dental records is seldom satisfactory because identification usually is urgent, to make possible the notification of next of kin and preparation of remains for shipment and burial.

Problems in determination of personal identity have been of the following types:

1. Identification in absence of any supporting evidence
2. Identification aided by supporting evidence that the remains may be those of a certain individual or of one of a known group
3. Identification of each unknown in a known group
4. Verification of identification already made by other means

When the dental record of a known is compared with that of an unknown, it is not mandatory that the two records



in order to establish positive identification. It is mandatory, however, that there be unquestionable points of similarity between the two records with no existing impossibilities, such as restorations on the dental record of the known which do not exist on the record made from the teeth of the unknown casualty. Points

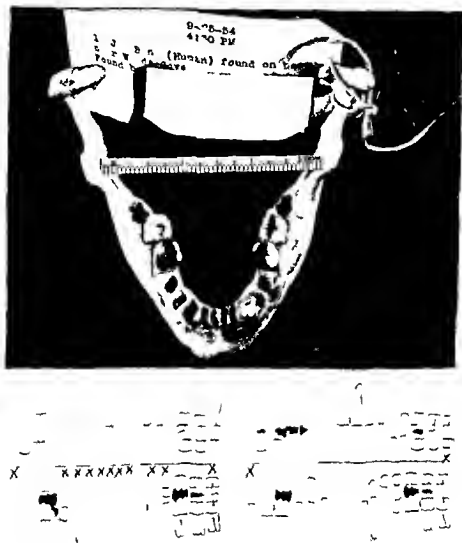


Figure 2. A mandible was found on a California beach in 1954. Police investigation revealed that it could possibly have been that of a man who had drowned in that area a year before. His body had never been found. He had served in the Navy in World War II. A positive identification was made by comparing the mandible with the Navy dental record (right). The chart (left) was made from the mandible. The empty root sockets in the mandible indicated that all teeth had been present at the time of death.

of similarity may be defined as artificial or natural dental characteristics that appear to have been recorded from the same individual.

No set percentage or set number of points of similarity should be required for establishing a positive identification, both because the number of natural and artificial dental characteristics varies and because each characteristic has a relative value based on the average rate of occurrence. Characteristics that rarely occur have greater value in establishing identity than those which occur frequently. By considering frequency of occurrence, the

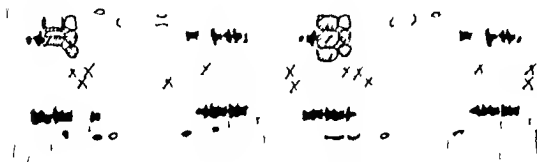


Figure 3 The chart above (left) was made in 1950 from the dentition of a skeleton found in the Mojave Desert. It was not until five years later that a billfold found in the area indicated that the skeleton might have been that of a Marine officer who had been missing since 1947. The dental record (right) made in 1946 when the Marine officer was discharged was obtained from the Naval Records Management Center and positive identification was made as a result of the comparison.

investigator may be able to establish positive identification, if no impossibilities exist, from a few or perhaps just one rarely occurring characteristic, whereas he would require the combination of several frequently occurring characteristics. For example Gold restorations provide better evidence than amalgam, missing cuspids than missing first molars, and lingual surface caries than occlusal surface caries.

The final determination as to whether the dental record of the known is also that of the unknown rests on the judgment of the investigator after evaluating the dental evidence at hand. In the Navy and Marine Corps where reasonably accurate records are available, experience has shown that when the record of the known is compared with that made from the unknown there is seldom any doubt. In almost all cases the record either matches or does not match.

## DISCUSSION

The importance of identification of the dead cannot be over emphasized. Establishment of personal identity is not only a passive sort of comfort to the next of kin but often is a requirement in the settlement of legal entanglements. Because cases that require identification by means of the teeth are relatively few, there is no organized body of dental experts in this field, nor are there any persons who spend full time in the science of forensic dentistry. It is however within the capability of all dentists to assist in the identification of the dead when teeth are involved. The determination of personal identity by means of the teeth therefore is a service to the other forensic sciences that may be rendered by the dental profession.

## SUMMARY

Complete and accurate dental records provide an excellent and sometimes the sole means of identifying the remains of active-duty military personnel and of civilians who have had previous military service.

Two factors make it possible to use the teeth for this purpose. (1) The crowns of the teeth, their supporting bony structures, and the restorative materials used by the dental profession are almost indestructible, and (2) there is little chance of there ever being two persons with identical sets of teeth.

## REFERENCES

1. Gonzal, T. A. vs. M. H. Iperu, M. and Lamberget, C. J. *Legal Medicine, Pathology and Toxicology*. Appleton-Century-Crofts, Inc., New York, N. Y., 1954, pp. 17-47.
2. Identification by teeth. *FBI Law Enforcement Bulletin*, October, 1940, p. 1.
3. Scott, D. B. Dental evidence in identification of criminology. In Giddens, R. B. H. (editor): *Legal Medicine*. C. V. Mosby Co., St. Louis, Mo., 1954, pp. 451-478.

# ENURESIS AND SPINA BIFIDA OCCULTA

SHELTON P. SANFORD *Captain MC USN*  
GILBERT W. KLIMAN, *Lieutenant MC USNR*

**T**OILET training and toilet habits are a source of varied pleasure and pain. Psychoanalytic studies reveal that much of our aggression, guilt, shame, and disgust, as well as happiness, are firmly associated with our toilet experiences. In such an area, one must expect that medical judgment will be difficult. Any objective contribution to our understanding of toilet habits will be especially valuable, since objectivity will be difficult to obtain except through unusual self knowledge or carefully designed experiment. The following article is a mundane matter of the latter sort: a study of the frequency with which an occult vertebral defect appears among enuretic patients and controls.

A satisfactory working definition of "enuresis" is "frequent urinary incontinence past the age of five, occurring primarily at night." Some definitions require the patient only to wet his bed past his third birthday, and still other definitions include daytime incontinence. Some authors require a frequency minimum of one episode of urinary incontinence per week. For practical purposes, such differences in definition are of little consequence in the area where enuresis is most frequently a large scale problem: military recruit selection. Our experience with enuresis was gained while observing patients in recruit status at this training center. Here, 0.3 per cent of all incoming recruits are discharged each year with the diagnosis "Immaturity reaction with symptomatic habit formation: enuresis." The occurrence of bedwetting even once or twice a month is enough to cause serious personal handicap to a recruit in the compulsively cleanliness conscious environment of a barrack or crew's quarters. As the diagnosis implies, an enuretic recruit is considered to suffer a personality disorder of which enuresis is only one symptom.

Studies of enuresis have been in two directions. Students of physiologic and anatomic orientation have sought electroencephalographic abnormalities,<sup>1</sup> urethral valve disorders, cystitis, and spina bifida occulta as causes. Students of personality disorder

have generally expanded on Freud's concept that enuresis is a masturbation equivalent. Among the enuretic patients of military age little support has been found for the etiologic importance of anatomic defects. Much work has however supported the psychologic viewpoint<sup>2</sup>—both by eliciting evidence of personality disorder among these patients and by either curing or decreasing the severity of the condition with psychotherapy.

The present study was undertaken in a spirit of wishing to do some justice to the anatomic approach at a time when personality studies have been greatly emphasized. One of us had long suspected that spina bifida occulta might frequently cause enuresis. This suspicion was a natural one. Enuresis is certainly a prominent difficulty for patients with manifest spina bifida particularly where other neurologic defects appear. Ingraham and Lowrey<sup>3</sup> reported that 7 of 65 children with spina bifida occulta were seen initially with complaints of "enuresis or other form of incontinence." Their surgical exploration of patients with spina bifida occulta and associated symptoms often disclosed a definite occult meningocele or a fibrous tract attached to the meninges or a lipoma within the gaping vertebral canal. Such associated abnormalities provide a mechanical explanation for neurologic symptoms that were seen in the patients studied.

Symptom producing abnormalities may lurk beneath an apparently innocuous and occult vertebral defect. Craig and Mulder reported the case of a 12 year old girl in whom severe neurologic symptoms were produced by a large fat pad which compressed the dura beneath a maldeveloped fourth lumbar spinous process. In addition the filum terminale was attached to the dura opposite the fourth lumbar vertebra exerting traction on the conus medullaris. Jelsma and Ploetner<sup>4</sup> found 48 out of a group of approximately 6 000 cases of low back pain in which they thought the pain was produced by spina bifida occulta. Such cases suggest that a disproportionate growth of the vertebral column might exert traction on the lower spinal cord by means of a fibrous tract between the cord and a vertebral defect. They provoke serious consideration of how often such abnormalities might occur in routinely observed and even asymptomatic cases of spina bifida occulta.

Evidence for relationship between occult spinal bifida and enuresis is uncertain. A pioneering study of military recruits was made prior to World War I by Fuchs<sup>5</sup> who reported a syndrome (*Myelodysplasia*) consisting of enuresis, lumbosacral superficial anomaly and roentgenographic evidence of spina bifida occulta. It was not until 1927 that a scientifically satisfactory study of enuresis and spina bifida occulta was made. This work by West,<sup>6</sup>

detracted much from previous anatomic and roentgenographic studies. He found no statistical relationship at all! Principal difficulties in reports on this subject are lack of properly selected control cases and lack of stated criteria for identifying spina bifida occulta on roentgenograms. These difficulties seem adequate to account for lack of agreement as to the incidence of spina bifida occulta among the general population and among enuretic patients. An example of a recent work which is difficult to evaluate, because it lacks controls, is Terulano and Jannelli's<sup>8</sup> study of 15 enuretic patients with spina bifida occulta. From their study, one can make no estimate of the frequency with which the spinal defect occurs in a comparable group of the nonenuretic population, and no estimate of the frequency of the defect among the general population of enuretic patients. The range of disagreement in the literature is well illustrated in table 1.

TABLE 1 *Spina bifida occulta*

Subjects studied by	Number of cases	Lumbar or sacral defect (per cent)	Lumbar defect (per cent)	Sacral defect (per cent)
Southworth & Bersack <sup>3</sup>	550	18.2	2.2	16.0
Hadley <sup>10</sup>	1,500	5.2	0.2	5.0
Brailsford <sup>11</sup>	3,000	17.0	6.0	11.0
Sutherland <sup>12</sup>	12,000	5.0	1.5	3.5
Wheeler <sup>12</sup>	1,000	36.0	23.0	13.0
West <sup>7</sup>	100	48.0		
Enuretics studied by				
West	81	51.6		
Mertz <sup>14</sup>	32	68.0		
Karlin <sup>15</sup>	25	84.0		

Of the studies listed in table 1, the best is the previously mentioned 1927 study of British recruits by West. West used 100 randomly selected controls and 100 enuretic patients, and also graded spina bifida occulta according to five degrees of severity. He found no difference in the incidence of spina bifida occulta among the two groups. In addition, he found that actually had a greater incidence of the three most severe degrees of spina bifida occulta! Working from a different

Simon and Mills<sup>14</sup> also cast doubt on the relevance of spina bifida occulta to enuresis. They sought histories of enuresis among 53 children with proven spina bifida occulta in whom there was not only roentgenographic evidence of spina bifida occulta but also one or more of the following "Sensory changes in the saddle area and lower extremities motor changes in the perineum and lower extremities clubfoot or other associated congenital anomalies." None of the patients with spina bifida occulta as defined above was found to be enuretic.

### METHOD

Roentgenograms were taken of 196 consecutive enuretic patients seen in the neuropsychiatric unit of this training center. All patients were recruits in the first weeks of recruit training. Their complaint of current enuresis was generally substantiated by observations from their company commander and by the neuropsychiatric unit corpsmen as well as by past history. By arbitrarily selecting every seventh recruit arriving at the "receiving unit," 181 controls were obtained. No attempt was made to establish how many of the presumably normal controls were actually enuretic. A separate study however revealed that only one of 172 incoming recruits was currently enuretic. All roentgenograms were "routine" anteroposterior lumbosacral views which usually included the lower thoracic, all lumbar, and at least the first two sacral vertebrae. Because of this limitation no reference will be made to spina bifida occulta below the second sacral vertebra. A reading of "spina bifida occulta" was made whenever a complete lack of dorsal or ventral fusion of a vertebral arch was noted. Simple absence of a spinous process was not called spina bifida. Partial fusion defects were not included. Any complete nonfusion was considered a spina bifida no matter how small the distance between the unfused portions. Interpretation of each film was made separately by three physicians each unaware of the interpretations of the others. Films were read in such fashion that the interpreter was generally unaware of the identity of the case—whether enuretic or control. Despite the separation and "blindness" deliberately inherent in the study there was disagreement concerning only two of the 277 roentgenograms studied.

### RESULTS

An outline of our results is present in table 2. In the control group 57 cases of spina bifida occulta were discovered on the anteroposterior lumbosacral roentgenograms. Among the enuretic subjects 60 cases were discovered. No significant difference was found in the distribution, extent, or frequency of spina bifida occulta in the two groups. If any differences were suggested by

the data, such differences were in the direction of greater spinal abnormalities in the "normal" control group. That is, there were two thoracic defects among the controls and each involved three vertebrae. No thoracic defects at all were found among the enuretic subjects. In addition, there was a somewhat higher incidence of lumbar defects among the controls than among the enuretic subjects. There can be no doubt that the overall incidence of spina bifida occulta in the two groups studied is statistically identical. Furthermore, there is no statistical difference in the distribution of defects among the two groups. The small preponderance of thoracic and lumbar defects among controls is attributable to random variations. The findings of Karlin<sup>12</sup> and Mertz<sup>14</sup> have thus not been substantiated by our study of the relationship between enuresis and spina bifida occulta.

TABLE 2 *Spina bifida occulta among enuretic naval recruits (controls 181 cases enuretics 196 cases)*

Defect	Controls (per cent)	Enuretics (per cent)
Spina bifida occulta	31	31
Thoracic	1	0
Lumbar	2	1
Sacral (S1 or S2)	30	30

One case with a thoracic defect also had a lumbar defect. Another case with a thoracic defect had a sacral defect and a lumbar defect. One case had combined lumbar and sacral defects (L5-S1) without a thoracic defect. There is an overlapping of percentages because of combined defects.

#### DISCUSSION AND CONCLUSIONS

We have been unable to support a hypothesis that enuresis has a strong association with spina bifida occulta. A lack of statistical correlation does not exclude another possibility. It may still be that some enuretics with spina bifida occulta would reveal spinal cord lesions if surgically explored. Such was the experience of Ingraham and Lowrey when operating on a group of patients with various neurologic difficulties occurring in association with spina bifida occulta. On the other hand, our results tend to dismiss rather than raise hope for discovering the cord as a frequent cause for enuresis among the studied. We conclude that other causes will be studied.



CV I VIII No 4

## REFERENCES

- each other's  
incidence of spina b f d a  
recruits The extent and distribution different  
groups were also not significantly different
- REFERENCES
- 1 Per e C M. and L peon H H Clin cal relat onship of enuresis to sle walking  
and P lepsy A M Arch Neurol & Psychiat 76 310-316 Sept 1956  
2 Fureston R W Wagner C M and Hart A D H Ev luat n of psychothera-  
peut c screen ng f r enuret c ruita U S Armed Forces M J 7 20-24 Jan 1956  
3 Ingraham F D and Lowy J J Sp na b f d a and cranium b f d um occult ap nal  
d sorder New England J Med 228 745 750 June 10 1943  
4 Cea s W M and Mold t D W Las neurologic symptoms f spina b f d a occult  
r port of ca e Proc Staff Meet Mayo Clin 31 98 100 F b 22 1956  
5 J Isma F nd Pl etn r E J Pa nial p n b f d a occulta w th r v w of l t era  
ture J Neurosurg 10 19-27 Jan 1953  
6 Fuch A Ueber d n klin chen Nachw s kongen taler Def ktbildung n n d n  
uns en Ro kenmarks bacht n n (My lodyspl ) Wien med. Wchnschr 59 c lamm 2141  
2147 2261 2267 1909  
7 West J W Not s on nves g t a to r l t n bew n sur a and ap na  
b f d a occul a str d our a Royal H b r t H sp t l Wo lwich J Roy Army M Corps  
48 38 45 1927  
8 Ferulan D and Jann H E L enur notturn da ap na occul ta spote p tor  
nen tch e enia vi di cura li farmacot ap ca (Nocturn l nures s caus d by p n  
f d a occul a pathogen c t c hypoth s and tr al of bel ochem th rapy) Gior ital chiv  
11 758 777 July 1955  
9 Southw rth J D and Be sack S R An mal s of lumbosacral r t b a n 550  
ind viduals w hout symp m r f e rable t l w b ck Am J Roentgenol 64 624-634  
Oc 1950  
10 Had y H G Frequency of spina b f d a Virgin a M Monthly 68 43 46 J n 1941  
11 Bi lsford J F Deformities f lumb sacral t s on of p n Brit J Surg 16  
562-627 Apr 1929  
12 Suberland C G Ro ugenograph c study f d v lopm nial a mal of sp n  
J Radiol 3 357 364 Sept 1922  
13 Wh l T Variab l s y op nal column s regards d fecs neural ar he (Rud  
mentary spina b f d a) Contributions to Embryology No 30 97 107 1920  
14 M rt H O R lar on f pua b f d a occul a s n uromu cula dysfuncti n of  
ur nary r a t with sev w of 6 cas s by lamin c omy J Urol 29 521 530 May 1933  
15 Karl n I W Inc denc f pin bifida occul a in chldr n with a d w th ur nre-  
s Am J Dis Ch l d 49 125 134 Jan 1935  
16 Emme t J L Smon H B and Mills S D Neur muscul dis as of the ur nary  
tract n f nts and chldr n Pediat Clin North America 2 803 818 Aug 1955

# MODIFIED MARSUPIALIZATION OPERATION FOR PILONIDAL SINUS

An Ambulatory Treatment Using Lidocaine  
as a Local Anesthesia

DANIEL J ABRAMSON M D

**P**ILONIDAL cysts and sinuses in early adult life produce symptoms of irritation, soreness, persistent discharge, or abscess formation. Pilonidal disease presents a great problem to the armed services, and a tremendous number of man days are lost because of this condition. Casberg<sup>1</sup> found that about 80,000 such patients were admitted to Army hospitals during the years 1941 through 1945, with an average hospital stay of 55 days for those surgically treated by excision procedures.

The marsupialization operation, or exteriorization of the sac wall for treatment of pilonidal sinuses, was described by Buio<sup>2</sup> in 1937. In 1950, I developed an exteriorization procedure in which the lateral walls of the sinus were excised and the remaining sac was marsupialized. The merits of this technique have recently been discussed by Phelan.<sup>3</sup> Seventy-three unselected patients treated by this technique have been reported previously.<sup>4</sup> In the present study of an additional 109 patients, 32 were treated by the same method.

Since the exteriorized sac wall is quickly obliterated by healthy granulations, several adjunctive procedures were tried in an effort to shorten the healing time. These consisted of secondary closure with wire in 11 patients, and pinch grafting in three. The results, however, were not superior to the procedure finally adopted in the last 63 patients, in which all the sac wall was excised except for a small midline strip measuring one fourth inch or less in width. All of these procedures were performed in the outpatient surgical department of this hospital. Local field block anesthesia was used, and operations were performed as an in and out procedure.

Following operation, the patients are placed on quarters for from three to five days and on limited duty for three weeks, and

---

From Walter Reed Army Hospital, Washington 12, D. C. Dr. Abramson is also on the Surgical Staff of Georgetown University Hospital, Washington, D. C.

then returned to full duty. Since hospitalization is not required and patients are returned to duty quickly, there has been an attendant monetary benefit to the Army and a minimal loss of man days by the use of this technic. The simplified marsupialization operation is applicable to all types of pilonidal sinus. The healing time is short, the morbidity minimal, and the results excellent.

### TECHNIC

An oral antihistaminic is given prior to operation and the patient is placed on the operating table in a modified jackknife position. The buttocks and sacral region are shaved and separated by adhesive traction. The area is prepared for operation with suitable antiseptics. Anesthesia is accomplished by peripheral field block using a 1 per cent solution of lidocaine hydrochloride with epinephrine. The deeper tissues are infiltrated with the anesthetic agent—it is unnecessary to inject the skin. Anesthesia is rapid, long lasting, and extremely effective because of the diffusion properties of lidocaine hydrochloride.

A grooved director or mosquito clamp is inserted into the sinus opening and the skin overlying the instrument is incised (fig. 1). It is important to open superiorly and inferiorly into normal tissue. All hair and infected granulation tissue is removed by wiping with a gauze pad. The wound is then probed for addi-

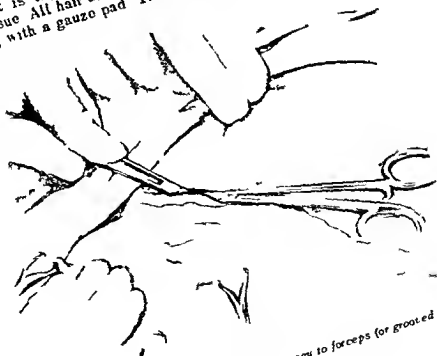


Figure 1 The sinus tract is opened over a mosquito forceps (or grooved director).

April 1957)

tional openings, and any accessory tracts are removed to their extent.

The skin adjacent to the sac is circumcised in order to outline the amount of the sac wall to be removed. An incision is made in the skin and forceps are applied to the circumcised skin edge. By sharp dissection (fig 2) the sac wall is exposed. Underlying fascia is exposed. A careful search is made for additional openings.

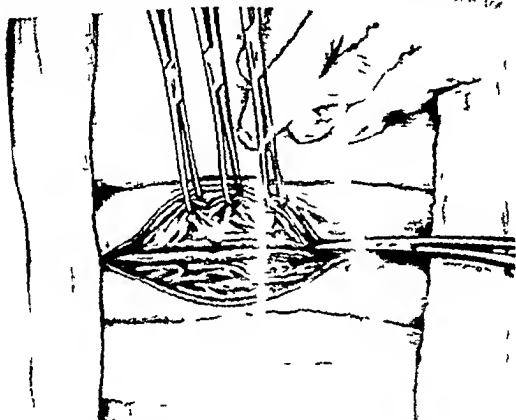


Figure 2. The surrounding skin edge has been undercut. Allis forceps are on skin. An incision has been made and excised by sharp dissection. Follow on the opposite side—approximately one fourth inch of sac.

The skin edge is sutured to interrupted chromic No. 00 catgut sutures, a bite being taken in the deeper tissues. The sutures are later removed. The procedure is repeated on the opposite side, and when the operation is completed approximately one-fourth inch of sac remains (fig 3). If well defined, the entire area is covered by underlying tissues or presacral pressure dressing is applied. Given Aspirin with codeine.

edge of the remaining sac with interrupted chromic, a bite being taken in the deeper tissues. The procedure is repeated on the opposite side, and when the operation is completed approximately one-fourth inch of sac remains (fig 3). If well defined, the entire area is covered by underlying tissues or presacral pressure dressing is applied. Given Aspirin with codeine.

patient is then placed on quarters for from three to five days and after three weeks of limited duty he is returned to full duty.

The postoperative care is simple but is as important as the operative procedure itself. It is essential to stress that healing must occur from the base and that each patient must be followed until healing is complete. The patient returns on the second day for redressing and usually volunteers the information that pain was negligible. The sutures are removed on the seventh day and Sitz baths or hot compresses are begun. He is seen and redressed

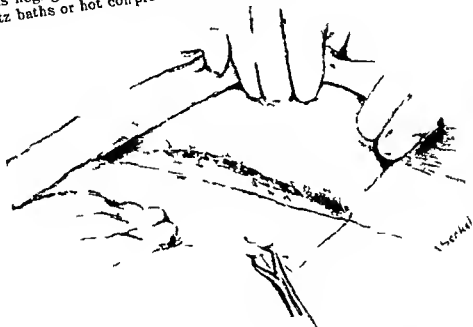


Figure 3 The skin edge is sutured to the remaining sac wall with interrupted chromic catgut

about every five to seven days thereafter. The intervening dressings are done by the patient. At each dressing the wound is cleansed and rubbed gently with cotton applicator sticks. It is important to keep the surrounding area shaved in order to prevent growth of hair into the wound. The sac wall is soon covered with healthy granulation tissues. Exuberant granulations are cauterized with silver nitrate. Complete healing occurs in about three weeks.

#### COMMENT

A history of prolonged periods of drainage abscesses, or recurrences was characteristic of the majority of the cases. In this present series of 109 cases there were 14 acute abscesses that required incision and drainage prior to marsupialization. In a total

of 39 patients the following surgical procedures had been carried out earlier: incision and drainage in 26, excision and primary closure in 6, and excision and open packing in 7. At operation, multiple or complicated tracts were found in 56 patients and a simple or single cavity in 53.

In the previously reported series the average healing time was 29.3 days. The technique at that time consisted of removing most of the lateral sac wall. The same method was performed in the first 32 patients of the present series with an average healing time of 25.8 days. Since granulation tissue quickly obliterates the lining of the sac, several adjunctive procedures were tried. After routine marsupialization, through and through stainless steel sutures were inserted. These sutures were tightened about a week after operation. The time of healing in 11 patients averaged 24 days. Another technique tried was marsupialization and immediate pinch grafting. The healing time in three such patients was 22 days. It was concluded that these adjunctive procedures had no advantage over the technique finally adopted in 1954 in which all the sac except one fourth inch was removed. The average healing time in 63 patients was 23.6 days. One patient in this last group had a healing time of 85 days, and one other, 124 days. And these two cases of prolonged healing been excluded, the average healing time would have been 21 days. In both of these patients there was a small unhealed area near the anus which finally was closed with wire sutures. Delayed healing was probably caused by proximity of the wound to the anus, repeated trauma to the area, and the obesity of the patient.

The postoperative course is usually uneventful. Pain and discomfort is minimal and healing occurs rapidly.

After complete healing had occurred, one patient developed an adhesive tape dermatitis followed by severe generalized furunculosis involving the buttocks and the scar. Another patient developed maceration of a superficial wide scar because of obesity, excessive moisture, and lack of personal cleanliness. A rather unusual situation in which the entire wound split open occurred one year after operation in one patient and shortly after operation in another. These will be classified as recurrences despite the fact that there was no evidence of sac or sinus tract. It was believed that local trauma or spreading of the buttocks might have contributed to this phenomenon, and in one patient a factitial element was suspected. The latter patient was transferred to another station before complete healing occurred. The other patient was healed by simple, routine measures.

#### DISCUSSION

The exteriorization or marsupialization procedure removes some of the shortcomings of primary closure techniques, such as the fre-

quent failure of primary union, the high rate of recurrence, and the prolonged constipating bed rest regimens. Excision and open packing procedures have the disadvantage of a prolonged healing time averaging three to four months, and the attendant discomfort of frequent dressings. The advantages of the modified marsupialization or exteriorization procedure may be listed as follows:

- (1) The procedure has universal applicability despite the size of the cyst, number of extensions, recurrences, or all other complications.
- (2) Local anesthesia is used for the procedure with a minimal loss of tissue and with adequate visualization of accessory tracts.
- (3) The morbidity is minimal.
- (4) The patients are ambulatory and almost unrestricted activity is permitted.
- (5) The patients are able to return to duty quickly and thus replacement is unnecessary.
- (6) The recurrence rate is low.
- (7) The scar is well healed, pliable and nontender, and the intergluteal contour is preserved.

The modified marsupialization or exteriorization procedure for treatment of pilonidal sinuses has been performed on a total of 182 patients in the outpatient department of this hospital. The first 73 cases have been previously reported. In the last 63 cases the healing time has been shortened to 23.6 days by leaving in situ only a small strip of the sac wall to which the skin is sutured. This series is the largest reported in which such an operation is carried out as an outpatient procedure using local anesthesia and with the patient ambulatory. This outpatient procedure has released hospital beds urgently needed for the treatment of more serious conditions. From the standpoint of cost and the number of man days saved it has benefited the government tremendously.

**ACKNOWLEDGMENT** The author wishes to acknowledge the assistance provided by Col Robert T Ganta, Chief Department of Surgery, Walter Reed Army Hospital.

#### REFERENCES

1. Casberg, M. A. Infected pilonidal cysts and sinuses. *Bull U S Army Med Dept* 9: 493-496 June 1949.
2. Bui, L. A. *Practical Proctology*. W B Saunders Co Philadelphia P 1937 pp 480-482.
3. Phelan, J T. Pilonidal sinus. *Med* 119: 172-177 Sept 1956.
4. Abrams, D J and Cox, P A. Marsupialization procedure for pilonidal cysts and sinuses under local anesthesia with lidocaine. *ambulatory method of treatment*. *Ann Surg* 139: 341-349 Mar 1954.

# CAVITY PREPARATION BY ULTRASONIC VERSUS ROTARY INSTRUMENTATION

## *In Vitro Cutting Effectiveness and Heat Production*

JACK L. HARTLEY *Major USAF (DC)*

**D**URING recent years considerable research has been directed toward the evaluation of new devices and techniques for the removal of tooth structure. Those innovations have been based primarily upon the fact that a higher rotational rate produces increased operating efficiency.<sup>1-3</sup> As rotational rate increases, there is an associated marked reduction in the amount of pressure necessary for cavity preparation and an increase in vibration frequency that results in a procedure less objectionable to the patient.<sup>4-6</sup> Higher rotational speeds produce temperature elevations that should be counterbalanced by cooling sprays of water and air directed within the operational field.<sup>7-9</sup> Although investigators have pointed out the advantages of the high speed techniques, many operators persist in using the time tested, low rotational speeds. In most instances this is due either to personal preference based upon a long period of satisfactory accomplishment with this technique or to the fact that some patients have found higher speeds objectionable.

A comparatively recent development in the field of operative dentistry instrumentation utilizes ultrasonic vibration, along with an abrasive slurry of aluminum oxide, for the removal of enamel and dentin. Reports in the literature cite that little pressure is required and that the very high frequency of vibration results in excellent patient tolerance, pulpal damage appears to be no greater than that caused by conventional rotary instrumentation.<sup>10-11</sup> Evaluation of newer devices and techniques by the U. S. Air Force Dental Service has been carried out and is continuing at the National Bureau of Standards and at this school, in an effort to determine operative techniques and equipment which will remove tooth structure with a maximum of effectiveness and a minimum of objectionable sequelae.

---

From Air University School of Aviation Medicine, United States Air Force, Randolph Air Force Base, Tex.



This study was designed to compare in vitro cutting effectiveness of rotating instruments at 400 rpm at 12 000 rpm and an ultrasonic instrument with a frequency of 29 000 cycles per second Simultaneous temperature measurements of the pulp chamber were accomplished throughout the experiment

### METHODS

Three basic instruments were employed in this investigation

1 A conventional dental engine modified by speed reduction pulley to produce a maximum bur speed of 400 revolutions per minute This high torque instrument could not be stalled by normal methods Conventional burs produced good cutting effectiveness but the life of the bur was exceedingly brief owing to the comparatively heavy pressures necessary for cavity preparation

2 A dental engine fitted with a high speed pulley which produced a maximum of 12 000 rpm at the bur This speed was selected because burs of current design produce their most effective results at this rate <sup>1</sup>

3 An ultrasonic dental instrument \*

The time required for cavity preparation was recorded by an electronic switch and chronometer mechanism designed for use with any of the three instruments The timing mechanism was energized by pressure upon the foot control of the instrument under test thus recording only the actual cutting time

Temperature recordings were accomplished by means of copper constantan No 32 gage thermocouples which activated a multiple channel recording potentiometer One thermocouple was placed directly into the pulp chamber of the extracted human tooth while another was placed so as to record the room temperature immediately adjacent to the operative area Pulp chamber temperature elevations above ambient readings were recorded

### PROCEDURE

Sound human teeth which had been extracted for prosthetic purposes or by reason of periodontal involvement were placed immediately in a Deepfreeze It was postulated that this rapid freezing would best preserve the hard and soft tissues until a sufficient number of sound teeth were collected for an experiment of this magnitude While still frozen, the teeth were mounted in artificial stone in the conventional mandibular and maxillary arch forms

A total of 150 cavity preparations were accomplished in the following manner For each of the three methods (i e low speed

---

\* This cavity preparation was purchased from the Cation Equipment Company, Long Island City, N. Y., New York

high speed, and ultrasonic) 10 Class I cavities were prepared in the bicuspid teeth and 10 Class I in the molar teeth. Ten Class V cavities were prepared in the anterior teeth, 10 in the bicuspids, and 10 in the molar teeth. The teeth selected were basically sound in that they did not contain carious areas greater than the early involvement of pits and fissures. Variations in the operational techniques were minimized by adherence to the following factors:

- 1 All procedures were accomplished by the same operator.
- 2 Preparations were standardized in outline form for each type of tooth.
- 3 Depth of cavity was controlled by the principles of correct resistance and retention form.
- 4 The operative technique was accomplished as nearly as possible as though for an actual case.
- 5 A cooling spray of water and air was employed while cutting at 12,000 r.p.m.

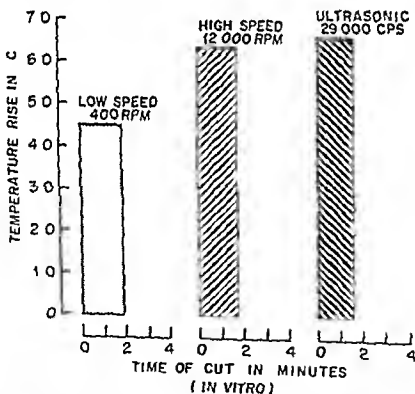


Figure 1 Comparison of heat production and actual time of cutting by the three techniques in Class I cavity preparations bicuspid teeth.

## RESULTS

Table 1 summarizes the results of the experiment. All three methods of instrumentation are plotted in bar graph form for each type of tooth and cavity preparation (figs. 1-5). The peak tem

TABLE I

*Time of cavity preparation in minutes*

Method	Anterior			Bicuspid			Molar		
	Class V			Class I			Class V		
	Average	Range		Average	Range		Average	Range	
Low speed (400 r p m rotary)	23	13-39		19	14-24		26	20-28	
High speed (17,000 r p m rotary)	17	15-19		16	14-29		17	09-19	
Ultrasonic	24	12-44		16	11-21		17	11-19	
							32	26-38	23
							35	29-45	25
							29	20-38	23

*Temperature rise above ambient in degrees centigrade*

Method	Anterior			Bicuspid			Molar		
	Class V			Class I			Class V		
	Average	Range		Average	Range		Average	Range	
Low speed (400 r p m rotary)	25	20-30		48	58-80		26	20-40	
High speed (12,000 r p m rotary)	100	80-120		63	40-80		39	35-47	
Ultrasonic	35	30-40		65	50-80		35	30-40	
							38	20-60	48
							66	50-90	47
							19	10-30	18

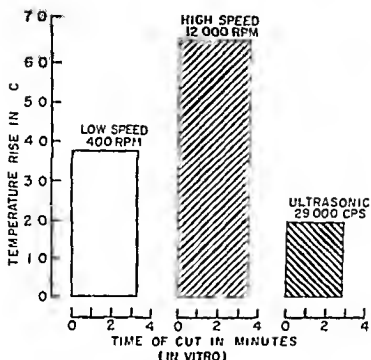


Figure 2 Class I cavity preparations molar teeth

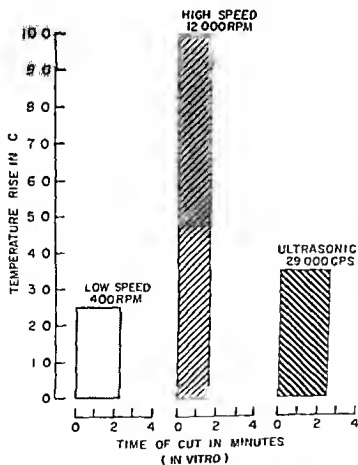


Figure 3 Class I cavity preparations anterior teeth

TABLE I

*Time of cavity preparation in minutes*

Method	Anteriora			Bicuspidia			Molars		
	Class V			Class I			Class V		
	Average	Range		Average	Range		Average	Range	
Low speed (400 r p m rotary)	23	13-39		19	14-24		26	20-28	
High speed (12 000 r p m rotary)	17	15-19		16	14-29		17	09-19	
Ultrasonic	24	12-44		16	11-21		17	11-19	
							32	26-38	
							35	29-45	
							29	20-38	
							23	19-25	
							25	22-35	
							23	21-32	

*Temperature rise above ambient in degrees centigrade*

Method	Anteriora			Bicuspidia			Molars		
	Class V			Class I			Class V		
	Average	Range		Average	Range		Average	Range	
Low speed (400 r p m rotary)	25	20-30		48	25-80		26	20-40	
High speed (12 000 r p m rotary)	100	80-120		63	40-80		39	35-47	
Ultrasonic	35	30-40		65	50-80		55	30-40	
							38	20-60	
							48	39-55	
							47	35-60	
							18	10-40	

## CAVITY PREPARATION

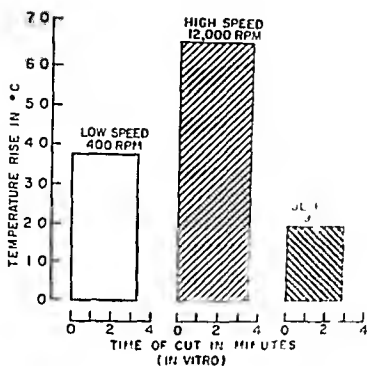


Figure 2 Class I cavity preparations molar teeth

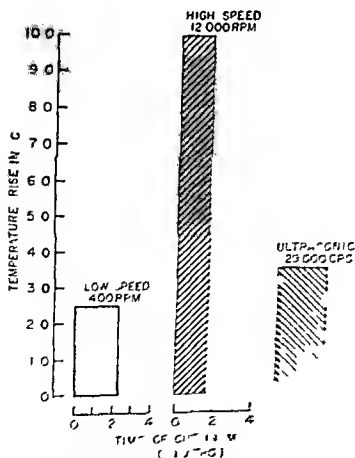


Figure 3 Class V cavity preparations

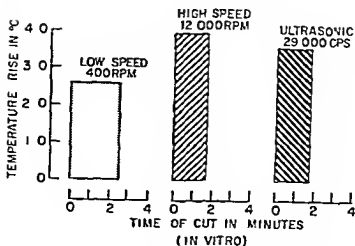


Figure 4. Class I cavity preparations, bicuspid teeth.

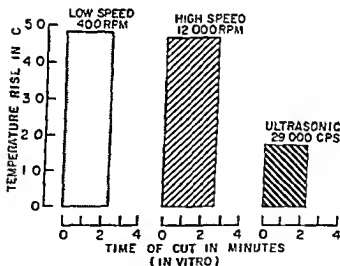


Figure 5. Class I cavity preparations molar teeth.

perature rise above ambient appears on the vertical axis. Total cutting time for each type of preparation appears on the horizontal axis.

### DISCUSSION

Different working pressures and methods of procedure were necessary in cavity preparation with the three techniques tested. The low speed, high torque procedure very similar to hand instrumentation required a very heavy pressure that frequently led to hand fatigue. Initial penetration of healthy enamel was difficult. The amplitude of vibration appeared very high. The basic

## CAVITY PREPARATION

51

frequency was calculated to be below the range of 1000 to 2000 cps determined by Walsh and Symons<sup>1</sup> to produce the most unpleasant sensation (Revolutions per minute of the handpiece and belt)

High speed instrumentation resulted in a marked reduction in hand fatigue because a much lighter hand pressure was required. Difficulty was experienced in controlling the instrument during the initial phases of cavity preparation due to the tendency to manifest when healthy enamel was removed. Although diamond instrumentation would be far more desirable for this phase of cavity preparation this study did not include the use of diamonds in an effort to evaluate the operating time of cutting without the diamond instrument as a basis for future studies.

An annoying high pitched whine was audible while operating at 12 000 r.p.m. The cooling spray exerted a soothing effect on the noise and functioned effectively in providing improved visibility by removing debris from the operative field. Preliminary studies carried out without the spray but with a stream of air directed upon the dry tooth indicate that the air stream provides maximal visibility during the removal of tooth structure. However, maximal cooling is achieved by a water air spray.

Utilization of ultrasonic instrumentation required no specific additional training, but, optimal operating efficiency could not be attained until the operator developed proficiency in the execution of an exceedingly light hand pressure. Purposeful, but excessive heavy hand pressure was applied to test the effectiveness of the cutting effectiveness was markedly diminished and the heat produced at the cutting tip was so intense that a brown black burn was produced in the dentin.

Visibility was very poor with the ultrasonic instrument. The abrasive slurry rapidly filled the cavity and obliterated the operative area. As a consequence frequent water flushes had to be carried out during the cutting procedure.

Two objectionable effects resulted from rapid wear of the cutting tip (1) Minute particles of metal, abraded from the tip, darkened the slurry and reduced visibility even further, and (2) rounded edges of the worn tip precluded the formation of sharp line and point angles.

To produce these requisites of proper cavity preparation, a new cutting tip had to be inserted. Changing the cutting tip was a time consuming procedure which required the following steps:

- 1 The worn tip was unscrewed



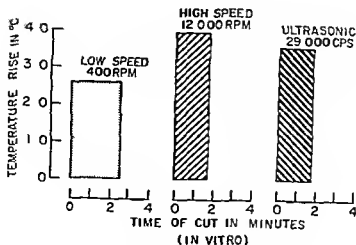


Figure 4 Class I cavity preparations bicuspid teeth.

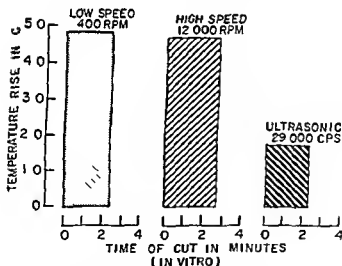


Figure 5 Class I cavity preparations molar teeth.

perature rise above ambient appears on the vertical axis. Total cutting time for each type of preparation appears on the horizontal axis.

### DISCUSSION

Different working pressures and methods of procedure were necessary in cavity preparation with the three techniques tested. The low speed, high torque procedure, very similar to hand instrumentation, required a very heavy pressure that frequently led to hand fatigue. Initial penetration of healthy enamel was difficult. The amplitude of vibration appeared very high. The basic

in the bicuspid and molars required an average of 2.1 minutes at 400 r p m. Class I cavities in the bicuspid and molars required an average of 2.5 minutes.

High speed instrumentation required an average of 1.7 minutes to cut Class V cavities in the anterior teeth. The bicuspid and molar teeth required an average of 2.0 minutes for the preparation of Class V cavities at 12,000 r p m. Class I cavities in the bicuspid and molars required an average of 2.5 minutes at the high speed.

Ultrasonic cutting with the abrasive slurry averaged 2.4 minutes for Class V preparations in the anterior teeth and 2.0 minutes for Class V preparation in bicuspid and molars. Class I cavities required an average of 2.2 minutes for preparation of bicuspid and molars by the ultrasonic technique.

---

ACKNOWLEDGMENT I wish to thank Captain Ira L. Shannon USAF (DC) for suggestions and assistance in the preparation of this article.

#### REFERENCES

1. Ingraham R. and Tanner H. M. Adaptation of modern instruments and increased operating speeds to restorative procedures. *J Am Dent A* 47 311-323 Sept 1953.
2. Hudson D. C. Hartley J. L. Moore R. and Sweeney W. T. Factors influencing cutting characteristics of rotating dental instruments. *J Am Dent A* 50 377-382 Apr 1955.
3. Peyton F. A. and Henry E. E. Effect of high speed burs, diamond instruments and air abrasive in cutting tooth tissue. *J Am Dent A* 49 426-435 Oct 1954.
4. Peyton F. A. and Henry E. E. Problems of cavity preparation with modern instruments. *New York Dent J* 22 147-157 Apr 1952.
5. Peyton F. A. Evaluation of dental handpieces for high speed operations. *J Am Dent A* 50 383-391 Apr 1955.
6. Walsh J. P. and Symmons H. F. Vibration perception and frequencies. *New Zealand Dent J* 45 106-114 Apr 1949.
7. Henschel C. J. Heat impact of revolving instruments on vital dentin tubules. *J Dent Research* 22 323-333 Aug 1943.
8. Lawton F. E. and Myers G. E. Control of frictional heat in cavity preparation. *Brit Dent J* 83 75-77 Aug 15 1947.
9. Anderson D. J. and Van Praagh G. Preliminary investigation of temperatures produced in burring. *Brit Dent J* 73 62-64 Aug 1 1942.
10. Oman C. R., and Applebaum E. Ultrasonic cavity preparation preliminary report. *New York Dent J* 20 256 July 1954.
11. Oman C. R. and Applebaum E. Ultrasonic cavity preparation progress report. *J Am Dent A* 50 414-417 Apr 1955.
12. Healey H. J. Patterson S. S. and Van Huyen G. Pulp reaction to ultrasonic cavity preparation preliminary report. *U S Armed Forces M J* 7 685-692 May 1956.
13. Butt B. Harris N. Shannon I. and Sander H. Histopathological evaluation of pulpal response to ultrasonic cavity preparation. Abstract No. 34. *I A. D. R. Abstracts* 1956.

2 The threads within the handpiece were cleaned by dipping the end of the handpiece into 70 per cent alcohol and retuning so as to produce resonance while in the alcohol

3 The threads were then blown dry

4 After the new tip was screwed into place the handpiece was retuned

During the latter part of the experiment it was found that the tip could be reshaped by grinding with a rotary hand instrument sharpener This procedure was entirely satisfactory and reduced the time lost considerably Although the tuning procedure was not difficult the time involved in reshaping or changing the tips of the ultrasonic instrument exceeded that necessary to exchange burs in the conventional handpiece

Considerable difficulty was encountered in maintaining control of the ultrasonic handpiece because of an unbalanced weight distribution The absence of rotational torque completely obviated any "walking" tendencies, but the weight exerted on the hand piece by the attached heavy tubing made it difficult to control the handpiece during precision cutting procedures It was necessary to observe stringent precautions to assure the removal of only the desired areas Very exact control of the handpiece could be maintained if a semiflexible upright support were attached to the top of the machine console to bear the weight of the tubing

The actual time involved in cutting procedures, when the ultrasonic instrument was used in cavity preparation compared favorably with the two rotary procedures However the over all time required for cavity preparation—including tuning the handpiece changing tips, and flushing the operative field—was somewhat greater than that required in the conventional technique Data on this phase of the evaluation are not presented because to be of value they should include results of actual clinical studies after further familiarization with the instrument

#### SUMMARY

Temperatures produced within the pulp chambers of anterior bicuspid and molar teeth, when cavities were prepared by low speed high speed and ultrasonic instrumentation ranged from a minimum average temperature rise of  $1.9^{\circ}\text{C}$  in molars following ultrasonic preparation to a maximum average rise of  $10.0^{\circ}\text{C}$  in anteriors prepared by high speed rotary instrument technique

The possibility of heat damage to the pulp during ultrasonic instrumentation properly employed appears to be no greater than with conventional rotary instrumentation

The average time required to prepare anterior Class V cavities with low speed instrumentation was 2.3 minutes Class V cavities

were not certain. In the whole series, 10 patients gave a family or personal history of atopy.

### HOSPITAL STAY

Complete blood counts, urinalyses, and sedimentation rates were obtained for 59 of the 68 patients. In this group of 59, the average hospital stay was 5.9 days. The range was from 2 to 10 days, except for two patients who stayed for 22 and 28 days, respectively. There was little apparent difference in the number of days of hospitalization between those who had taken penicillin orally and those who had received intramuscular injections. All patients were discharged from the hospital when they had been free of symptoms for 24 hours. Four were later readmitted in relapse after strenuous physical activity. Many other patients undoubtedly had minor relapses, but not severe enough to necessitate rehospitalization.

### CLINICAL PICTURE

Of the 68 patients studied, 14 had mild or severe angioneurotic edema, 20 had transient urticarias of the typical "hive" type, 7 developed the so-called fixed urticarias, and 25 presented a picture of typical erythema multiforme like reactions (fig. 1). One of these patients developed large bullae at the site of the urticarial lesions (erythema multiforme bullosum). Five patients developed purpura, in two this appeared to be primary, and in three the purpura was secondary to severe urticarial lesions. One patient, who had no atopic history or background, developed a fine papular eruption in the flexural folds. This subsided completely in three days. Another patient developed a mild anaphylactoid shock type reaction with angioneurotic edema about the face within 20 minutes after ingestion of the first penicillin tablet. Joint pain and swelling were present in 41 of the 68 patients, and 7 were initially admitted to the hospital with the provisional diagnosis of rheumatic fever with joint pains, tachycardia, and urticarial skin eruptions. Four other patients initially developed morbilliform eruptions and temperatures and were admitted to isolation wards with the provisional diagnosis of rubella. Thirty-four patients had temperature elevations of over 100° F orally.

On admission to the service, the patients were given in rotation either a placebo, an antihistaminic, or 20 units of corticotropin (ACTH) intravenously, and all were placed on bed rest. Those who received the placebo progressed as well as those given an antihistaminic or ACTH. Four patients with extremely severe reactions and discomfort were given cortisone orally. The patients on cortisone treatment were discharged within 24 hours after the subsidence of their reactions, as were the others, however, they

# REACTIONS TO PROPHYLACTICALLY ADMINISTERED PENICILLIN

A Study of Sixty Eight Hospitalized Patients

KENNETH H BURDICK *Captain USAF (MC)*

**I**N RECENT years many articles reporting allergic reactions to penicillin have appeared<sup>1-4</sup>. Unfortunately many of the reports deal with persons receiving penicillin therapeutically for various diseases and the clinical picture and reported laboratory findings of the allergic reactions have been modified by these illnesses. In a recent attempt to abate an epidemic of streptococcal disease at this installation, the entire military population, with the exception of those persons on leave or those suspected of being allergic to penicillin were given prophylactic penicillin. This study deals only with those persons requiring hospitalization for severe reactions of an allergic nature in whom reactions from other drugs foods or illness were excluded by history and by physical examination. The scope of this article has been limited to an attempt to correlate the clinical picture with the changes in common laboratory results and to relate those to the number of days of hospitalization and the length of the incubation period.

## OBSERVATIONS

Penicillin was administered prophylactically to 13 113 persons, potassium penicillin G was given orally to 7 307 in a dosage of 313 5 mg (500 000 units) a day for 10 days while 5 806 received either 495 5 mg (600 000 units) or 743 2 mg (900 000 units) of benzathine penicillin G intramuscularly. During the six week period of this study, 68 of the 13 113 (0 5 per cent) were admitted as patients who filled the above criteria. Of the reactions in the patients, 52 followed intramuscular administration of penicillin and 16 followed oral administration. Fifty of the patients stated that they had received penicillin before this study. Eleven stated they had not taken penicillin previously in any form and so

Sedimentation rates, determined on 59 patients, were divided into three groups—those from 1 to 10 mm/hour, those from 11 to 20 mm/hour, and those above 20 mm/hour. Sedimentation rates of the patients in each group were compared with the average days of hospitalization, leukocyte count, and febrile reaction (table 1). Of the 59 patients, 37 had sedimentation rates of over 10 mm/hour, with 21 patients having sedimentation rates of over 20 mm/hour. Nine of these were above 30, the highest being 48 mm/hour. Grouping these patients by sedimentation rates and comparing these rates with the average days of hospitalization revealed that there was little relationship between sedimentation rate and length of hospitalization. No significant conclusions could be drawn concerning the relationship between oral administration of penicillin and elevation of the sedimentation rate.

TABLE 1 *Relationship of sedimentation rate to leukocytosis, elevated temperature, and length of hospitalization of 59 patients.*

Sedimentation rate (mm/hr)	Number of patients			Days in hospital		Leukocytosis		Fever	
				Average	Range	Number	Percent	Number	Percent
1-10	22	Injection	16	6.6	2-10	10	46	10	46
		Oral	6	5.8	3-9				
11-20	16	Injection	11	5.4	2-9	6	38	12	75
		Oral	5	4.0	3-5				
21 plus	21	Injection	20	6.3	3-9	13	62	12	57
		Oral	1	4.0					
Total	59	Injection	47	5.9		29	49	34	58
		Oral	12						

One was 22 days

One was 28 days

Leukocyte and differential blood counts were reported for 59 of the patients. A leukocytosis exceeding 10,000/ $\mu$ l was found in 29 cases, the highest being 18,000/ $\mu$ l. Table 1 indicates that there was little association between leukocytosis and sedimentation rates. Differential counts were not abnormal, only one patient showing a significant elevation of the eosinophil count.

## CLINICAL FINDINGS

Thirty four patients showed febrile reactions of over 100°F. It is interesting to note from table 1 that there was no apparent relationship between the number of patients with fever and the extent of elevation of the sedimentation rate.

As shown in figure 1 41 patients had joint pain and/or swelling of the joints at some time during their hospitalization. We were unable to demonstrate any apparent relationship between the presence of joint involvement and either the number of days' hospitalization or the degree of elevation of sedimentation rate.

**Reaction Time** For the 52 patients who had received benzathine penicillin G intramuscularly the time from the injection to the beginning of allergic symptoms averaged 10.3 days with a range of 1 to 21 days. There was no apparent relationship between the degree of elevation of sedimentation rate and the time of onset of symptoms. Although it has been thought that a prolonged incubation period may be followed by a more severe and longer lasting allergic reaction we were not able to demonstrate that those with long incubation periods spent more days in the hospital than those with short ones. The patients were divided into three groups by the number of days from injection to development of symptoms. As may be seen in table 2 38 (73 per cent) of the 52 were in the 4 to 14 day group. There were 7 in the 1 to 3 day group and 7

TABLE 2 Incubation periods of penicillin reactions and length of hospitalization in 52 patients receiving penicillin intramuscularly

	Group 1	Group 2	Group 3
Number of patients	7	38	7
Number of days between injection of penicillin and reaction	1.3	4.14	15.21
Days hospitalized	6.0	5.3	5.0

in the 15 to 21 day group. Contrary to our previous clinical impressions the reactions of the latter group were neither more severe nor longer lasting than those in the other groups.

## SUMMARY AND CONCLUSIONS

This study attempted to associate the severity of prophylactic penicillin reactions with common laboratory studies. Certain clinical observations and incubation periods. No association was evident in terms of average days of hospitalization between sedimentation rate, leukocytosis or fever. In those

patients with elevated sedimentation rates there was no association with the presence or absence of joint involvement, fever, or elevated white blood cell count. The time interval between injection of the drug and appearance of symptoms (incubation period) had little bearing on the length of hospitalization. In these hospitalized patients, reactions from benzathine penicillin G were apparently no more severe or prolonged than those from penicillin given orally.

It must be emphasized that the presenting symptoms and laboratory findings in many of these patients may closely simulate those of acute rheumatic fever and/or several of the exanthemata.

#### REFERENCES

- 1 Kitchen D K, Rein C R, Thomas E W and Spoor H J. Reactions to penicillin. *Am J Syph* 35: 578-582 Nov 1951.
- 2 White C B. Reactions to penicillin given orally in mass prophylaxis. *U S Armed Forces M J* 4: 1606-1608 Nov 1953.
- 3 Strauch J H, Byrd W G and Eng G O. Penicillin reactions. *Texas J Med* 50: 699-703 Oct 1954.
- 4 Winton S S and Nora E D. Immunologic aspects of penicillin reactions. *Am J Med* 18: 66-73 Jan 1955.

---

#### MED ABBR

"Another reprehensible form of jargon is the medical abbreviations which cause the inexperienced speaker to say LMD sent pt in with clouded CVA and abnormal EKG. IVP was normal but LUQ was tender and AURI was present. PPD was OK and lab showed CBC compatible with DOA. The speaker might just as well lapse into Hindustani which would be much more musical and just as informative. Another pernicious habit is to compare everything with food as 'rice water stool', 'prune juice sputum', 'pea soup pus', 'walnut sized mass', 'anchovy sauce pus', 'cauliflower mass', 'currant jelly stool', etc. ad nauseam."

—WARNER F BOWERS Col, MC USA  
in *Military Medicine*  
p 458 Nov 1955



# THE ISOLATION OF ENTERIC PATHOGENS AT BARROW, ALASKA

JACK T. CULLISON *Technical Sergeant, USAF*  
THOMAS R. A. DAVIS *M. D.*

**R**EPORTS of gastroenteric diseases in Alaska though common and substantiated by observation have not received adequate epidemiologic study. In 1953 Pauls<sup>1</sup> stated that outbreaks of diarrheal diseases commence during the spring "breakup" and continue throughout the summer. The peak of incidence during this period is not known and an evaluation of the true incidence and severity of such disturbances is difficult because cases are poorly documented, containing little information as to the specific causes of the disease. In 1950 Williams<sup>2</sup> published a list of *Salmonella* and *Shigella* organisms isolated in Alaska indicating the presence of a number of types of both groups. Early reports<sup>3,4</sup> cited outbreaks of typhoid and paratyphoid occurring at Barrow, Alaska and blamed water as the means of transmission. Because of the sporadic distribution of cases, a recent study<sup>5</sup> throws some doubt on the involvement of water as a means of transmission.

During the months of November 1954 and February and July 1955 this laboratory had opportunities to conduct studies of enteric pathogens among the Eskimos at Barrow, Alaska. This study was initiated to determine the possible influence of the enteric disease problem in Alaska on military personnel stationed in remote areas.

Barrow, an Eskimo village situated on the northernmost tip of the Alaskan Territory in 71° 21' north latitude and 156° 17' west longitude is composed of some 1,200 Eskimos. This particular village was selected because it was believed to be typical of most coastal villages, and many of the facilities required for this study were available at the Alaska Native Service Hospital.

---

From Arctic Aeromedical Laboratory, Land Air Force Base, Alaska. Ser. Cullison is now assigned to U. S. Air Force Hospital, Parks Air Force Base, Calif. and Dr. Davis is with the U. S. Army Medical Research Laboratory, Fort Knox, Ky.

## METHODS AND RESULTS

fecal specimens were collected in 4 ounce ointment containers which had been distributed to the natives through the Alaska Native Service Hospital personnel. Response was good, and a total of 240 samples were collected.

The preliminary bacteriologic examination consisted of introducing 1 gram of feces into tetrathionate or selenite F enrichment broth and incubating for from 18 to 24 hours at 37°C. Specimens were then transferred to *Salmonella* Shigella (SS) agar plates and again incubated for a period of 24 hours at 37°C. Suspicious colonies were then transferred to nutrient agar slants, incubated, and returned to this laboratory for further investigation.

Generic identification was based upon their cultural and biochemical reactions in Kligler's iron agar, SS agar, together with the absence of urea production and their reaction in various carbohydrate fermentation media. Organisms displaying characteristics for *Salmonella* or *Shigella* were then typed with *Salmonella* polyvalent serum, grouping sera, and *Shigella* grouping sera.

Thirty six isolations of *Salmonella typhimurium* and one of *Shigella sonnei* were made from the fecal examinations. None of the natives had diarrhea during the samplings, thus the organisms represent a subclinical or carrier state.

Ten of the samples obtained in February 1955 were from individuals who had been previously sampled during the preceding November. Four of these subjects were found to possess *S. typhimurium* in November, but not in February. Two individuals were found to have this organism in both November and February. The subject positive for *S. sonnei* in November was negative in February.

Numerous cultures of paracolon organisms, most of which belonged to the *Hafnia* group, were isolated. At the present time the pathogenicity of the paracolon group is debatable, and an evaluation of the part they play in the gastrointestinal diseases must await further studies. However, the present evidence indicates that they may produce disease under certain conditions.

Results of the cultures are given in table 1. Ages of the individuals from whom samples were taken varied from 22 days to 75 years. This number represents the combined number of individuals from each of the three sampling periods. Age distribution agrees with other records of incidence of these organisms in that well over half the number of positive cultures occurred in the first two age groups.

TABLE 1 Incidence of *Salmonella* in fecal specimens from the native population of Barrow Alaska

Age groups (years)	0-9		10-19		20-29		30-39		40-49		50		Totals	
	W	S	W	S	W	S	W	S	W	S	W	S	W	S
Season														
Number sampled	52	33	23	9	31	5	23	10	20	12	11	11	160	80
Number positive	7	5	5	2	1	3	1	2	1	2	4	3	19	17
Per cent positive	13.5	15.2	21.7	22.2	3.2	60.0	4.3	20.0	5.0	16.7	36.4	27.3	11.9	21.3
Significance of difference between winter and summer	None		None		P < 0.1		None		None		None		None	

Significance of difference between winter and summer

Combined significance for 20-49 year age groups P < 0.1

W winter S summer

As soon from table 1, a significant difference between winter and summer samples existed in the 20- to 29 year age group. These statistical differences were computed by the chi square method with corrections applied for small sampling numbers where appropriate.

### DISCUSSION

The table shows that in all age groups carrier rates were high, and no demonstrable clinical symptoms in any of the people investigated could be elicited. Because of the seasonal variation of this rate together with the fact that many of the individuals who were positive in the summer were negative in the winter, it is questionable that the use of the term "carrier" is applicable to the *Salmonella* picture demonstrated in Barrow. It is perhaps more accurate to consider the presence of *Salmonella* in the stool specimens either as the residuum of a recent clinically demonstrable infection or as evidence of subclinical infection. This would suggest that, at Barrow, reinfection of the community goes on throughout the seasons and that the rate is altered by the influence of seasonal change on the total availability of the infecting organisms. The practice in coastal villages is to obtain a water supply in the summer from sources which are easily contaminated by unhygienic practices of garbage and human waste disposal. In the winter, the water supply at Barrow is stated to be obtained by cutting ice blocks from a nearby lagoon. This may be true in many instances, but personal observations have shown that much of the water supply is obtained by melting snow collected from the immediate vicinity of the home, where dog teams are tethered and where human waste is thrown from "honey buckets." Thus continuous reinfection of the population can occur. This in turn produces a high immunity rate in the community, which could produce the sporadic appearance of clinical cases difficult to correlate as to method of transmission. *Salmonella* studies by this laboratory in the canine population of Barrow have shown rates of infection similar to those demonstrated for humans in this report.<sup>5</sup>

The study reported here does not show the presence of *Salmonella typhosa* or any other members of this genus. Since other studies have reported outbreaks labeled typhoid and associated with some reports of isolation of the organism,<sup>2-4</sup> the lack of such evidence in our study may be due to the sampling inadequacy. Only one isolation of *Shigella* was found, and a second sample from this individual three months later was negative. Again this may be due to the limitations of the methods used in this study.

This report adequately demonstrates the importance of enteric diseases in an arctic village. Their impact on the morbidity and mortality of the population is not known because of the difficulties of being on the spot at the right time and the inadequacy of existing records. In another similar study at Fort Yukon, there was found to be a high incidence of diarrheal disturbances in the 0 to 9 age group occurring eight times oftener than in any other age group.

With the exception of *S. sonnei*, it is unlikely that the enteric pathogens as found here will seriously affect the well being of military personnel. The military practice of immunization and the existence of cross immunization together with reasonable sanitation measures will afford protection. However mild gastro enteric disturbances in military personnel in the arctic do occur and the influence of these on over all operational efficiency is a factor to be considered.

### SUMMARY

Investigation of the population of Barrow for salmonellosis shows a relatively high incidence of the causative organism in all age groups. A seasonal variation is demonstrated with about a 100 per cent increase of isolations in the summer as compared with those in the winter. The implications of these findings are discussed.

**ACKNOWLEDGMENTS** The technical assistance by Sergeant E. D. Pace and Airman First Class S. D. Slevin and the co-operation of the personnel of the Alaska Native Service Hospital at Barrow are gratefully acknowledged.

### REFERENCES

1. Paul, F. P. Enteric diseases in Alaska. Arctic 6: 205-212, Oct. 1953.
2. Williams, R. B. Summary of Salmonella and Shigella of Alaska. Northwest Med. 340-341, May 1950.
3. Stefansson, V. Arctic Manual. Macmillan Co. New York, N. Y. 1944.
4. Gordon, J. E. Transmission of intestinal pathogens in polar climates. Annual Report of the Commission on Environmental Hygiene of the Armed Forces Epidemiological Board, 1956.
5. Schlott, J. C. Survey of Salmonella infections of dogs in Alaska. Arctic Medical Laboratory in preparation.
6. Davis, T. R. A. and Collins, J. W. Salmonellosis in Fort Yukon, Alaska. Arctic Aeromedic Laboratory in preparation.

# IMPROVING PREDICTABILITY OF MINNESOTA MULTIPHASIC PERSONALITY INVENTORY

GERALD J. BRISKIN *First Lieutenant USC USAR*  
JAMES A. STEVENS A B

OVER a period of two years in our particular setting, a mental hygiene clinic on a military reservation, we have become increasingly aware of a discrepancy between diagnostic statements made from the Minnesota Multiphasic Personality Inventory (MMPI) and the final diagnosis arrived at by joint staff efforts. The MMPI profiles consistently indicated that the patients were sicker than they appeared either clinically or by other psychologic instruments.

This discrepancy appears to be the result of differences between the population of this particular Army post and the population on which the MMPI was standardized. We are dealing with an essentially younger population (mean age 22 years, standard deviation 3.84 years) in a setting in which illness can bring strong secondary gain such as light duty, hospitalization, dismissal of possible courts martial charges, and even release from service.

Our intent in this study was to revalidate the MMPI for the specific population with which it was being used.

## METHOD

An attempt was made to increase the predictive ability of the MMPI by revalidating it to conform more readily with the specific population with which it was being used. This was accomplished by (1) determining the means and standard deviation for each of the subscales of 80 MMPI profiles selected at random from our files and (2) recalculating the T scores for the population being studied. To fix the average score at 50 this standardization (table 1) was accomplished by use of the following formula:

$$T = 50 + \left( \frac{\sum \bar{X}}{S} \right) 10$$

---

From Mental Hygiene Consultation Service, Fort Campbell, Ky. Dr. Briskin is now at Byron Harless and Associates, 420 West Lafayette Street, Tampa, Fla.

Twenty four MMPI profiles were next selected at random from the files. None of these records had been included in the above samples. Using the usual precautions to control for bias, two experienced clinicians then interpreted them attempting to place them in one of the following diagnostic categories: normal, neurotic, psychotic, and character and behavior disorder.<sup>2</sup>

TABLE 1 *Revalidated means and standard deviations of the subscales of the MMPI for the Fort Campbell population*

Subscale	Mean	Standard deviation
7	47.95	24.59
L	4.44	2.68
F	11.78	9.67
K	12.08	5.13
Hs	12.93	7.23
D	27.37	8.00
Hy	27.31	7.10
Pd	26.25	6.35
Mf	23.23	5.65
Pa	13.36	7.80
Pr	23.80	11.70
S	27.13	15.25
Ma	19.78	5.90

These 24 records were then replotted using the T scores determined above and again interpreted in terms of the four scoring categories. Chi squares were then calculated to determine whether or not the clinicians were in significant agreement with each other.

Each of the clinician's judgments from both the standard MMPI data and the revalidated data, were compared to the final diagnosis (table 2) and tested by chi square. The final diagnosis of the patient was arrived at by psychiatric interviews, a complete battery of psychological tests, and a social history.

### RESULTS

Table 3 summarizes our findings. Dealing with standard MMPI's the judges agreed diagnostically on 15 cases and disagreed on 9. The chi square of their agreement is 18.00 and is significant at the 0.001 level.

TABLE 2 *Summary of data*

Case	Standard MMPI		Revalidated MMPI		Final diagnosis
	Judge 1	Judge 2	Judge 1	Judge 2	
1	Ne	Ne	Ne	Ne	P
2	C	Ne	C	C	C
3	P	P	C	C	C
4	P	P	C	C	C
5	No	No	Ne	C	C
6	P	P	P	C	C
7	P	P	P	P	C
8	C	C	C	C	C
9	P	Ne	C	C	Ne
10	Ne	Ne	Ne	Ne	C
11	P	C	C	C	C
12	Ne	Ne	Ne	Ne	C
13	P	C	P	P	C
14	P	P	Ne	Ne	Ne
15	Ne	Ne	Ne	Ne	C
16	P	No	No	No	C
17	Ne	C	C	C	C
18	C	No	C	C	C
19	C	No	No	No	C
20	Ne	Ne	C	P	No
21	P	C	C	C	C
22	P	P	C	C	C
23	P	P	C	C	P
24	P	P	C	C	C

No = Normal

Ne = Neurotic

P = Psychotic

C = Character and behavior disorder

However, in predicting the final diagnosis from standard MMPI's, judge 1 was correct in only 5 cases and judge 2 was correct in 7 cases. These results, when tested by chi square, are purely chance.

When the revalidated MMPI profiles were used, the judges agreed diagnostically on 21 cases and disagreed on 3. This is significant at the 0.001 level. In predicting the final diagnosis, the two judges were able to do so successfully in 11 and 13 cases respectively, and these findings reach significance at the 0.02 level or better.



TABLE 3 Chi squares showing significance of agreement between judges and final diagnosis

	Agreement between judge		Agreement between judge 1 and final diagnosis		Agreement between judge 2 and final diagnosis	
	Observed	Chance expectancy	Observed	Chance expectancy	Observed	Chance expectancy
Standard MMPI's Agree	15	6	5	6	7	6
Disagree	9	18	19	18	17	18
	$\chi^2 = 18.00$		$\chi^2 = 0.22$		$\chi^2 = 0.22$	
Revised MMPI's Agree	21	6	11	6	13	6
Disagree	3	18	13	18	11	18
	$\chi^2 = 50.00$		$\chi^2 = 5.56$		$\chi^2 = 10.89$	

df = 1

Significant at 0.02 level

Significant at 0.001 level

## DISCUSSION

Psychologists as scientists prefer to utilize as well as place greater confidence in standardized tests. Nevertheless such tests have serious limitations. Because they are so well standardized the tendency is to use them blindly in all clinical settings without regard to the particular population involved. Yet these populations or subpopulations if you will may vary markedly in cultural background, needs, attitudes, or other variables, and these discrepant variables may seriously impair the validity of the test being used.

Certain tests lend themselves to revalidation readily. When such is the case as in this study, revalidation can improve the predictive ability of a test to a significant degree.

It should be pointed out that even though the judges in this study were able to predict the criterion significantly, their combined predictive accuracy was only 50 per cent. Even allowing for errors in the final clinical diagnoses, this predictive accuracy is lower than would be optimally desired. It is suggested that the percentage of correct predictions can be further increased if tests are given in batteries. When the diagnoses based on a test battery for the experimental group are compared to the final clinical diagnoses, the predictive accuracy rises to approximately 79 per cent (agree 19, disagree 5).

Consequently, we conclude that increased predictive ability can be obtained by specific revalidations of the test involved and/or the administration of test batteries

### SUMMARY

An attempt was made to increase the predictive ability of the Minnesota Multiphasic Personality Inventory (MMPI) by revalidating it to conform more readily with the specific population with which it was being used. This was accomplished by determining the means and standard deviations for each of the subscales and then recalculating the T scores for the population being studied.

Making diagnostic predictions on the basis of four categories—normal, neurotic, character and behavior disorder, and psychotic—two judges, using the revalidated data, were able to predict with significant accuracy the final psychiatric diagnosis. When these same judges attempted to predict the final diagnosis, using the standard MMPI profiles, their efforts were on a purely chance basis.

In conclusion, it is believed that the predictive ability of the MMPI can be improved if the test is specifically revalidated for the particular subpopulations with which it is being used.

The method outlined above is suggested for determining local norms which may be used by psychologists employing the MMPI and/or tests of a similar nature.

### REFERENCES

- 1 Hathaway S. R. and McKinley J. C. *Minnesota Multiphasic Personality Inventory Manual*. 2d edition. The Psychological Corp. New York, N. Y. 1951.
- 2 Department of the Army. *Nomenclature and Method of Recording Psychiatric Conditions*. SR 40 1025-2. U. S. Government Printing Office. Washington, D. C. 1949.



## Clinicopathologic Conference

U S Naval Hospital Philadelphia Pa \*

### ATAXIA DECREASED VISION UPPER EXTREMITY WEAKNESS

**Summary of Clinical History** Since birth this 25 year old white woman had decreased vision of the left eye with occasional diplopia. She has also had intermittent anorexia for several years with frequent bouts of nausea vomiting and hiccoughing. At the age of 23 when 6 months pregnant she was admitted to another hospital with frequent hiccoughing weakness of the right arm and inability to raise the right hand. A myelogram showed evidence of a central nervous system lesion involving almost the entire cervical canal. A cesarean section was performed with delivery of a living male fetus.

Following discharge from that hospital the patient's condition remained essentially the same although there was an increase in weakness of the right hand and arm. Right occipital and temporal headaches occurred at more frequent intervals and she lost 40 pounds. She did not consult a physician in the two years since her discharge from the other hospital. She was admitted here at the age of 25 years and weighing 91 pounds.

**Physical Examination** On admission the patient was a fairly well developed but emaciated woman appearing her stated age of 25 years. The pupils were round regular and equal and reacted to light and accommodation. Extra ocular movements were

Capt Ch 1 s L Fergus n MC USN Command g Officer Fr m th N u r s u r g c l  
Service Lt N a l l A r n u MC USNR Ch f

normal Visual acuity was markedly diminished in the left eye. Funduscopy was unsatisfactory, but dilated tortuous veins were seen in the left eye, and in the medial part of the retina several small rod spots were noted. There was tenderness on percussion and palpation of the posterior aspect of the neck from the atlas to the 7th cervical vertebra. No lymphadenopathy was noted. Lungs were clear to percussion and auscultation. The heart was normal in size, position, rate, rhythm, and force. No murmurs were heard. The abdomen presented a well healed midline cesarean section scar. There was an orange sized mass in the epigastrium and periumbilical region, which was apparently freely movable but firm and nontender. A neurologic examination showed marked weakness of the right hand, forearm, and arm, moderate weakness of the left hand and arm, and atrophy of the muscles of both hands. The gait was slightly ataxic, and there was a negative Romberg sign. Concentric contracture of the visual fields of the left eye, greater in the temporal fields, was noted. Vibratory and position senses in the right upper extremity were absent. The lower extremities showed hyperactive deep tendon reflexes throughout. Hoffmann's sign was positive on the right.

**Laboratory Studies** A lumbar puncture revealed that cerebrospinal fluid pressure was 140 mm, which was elevated to 310 mm by abdominal straining and to 230 mm by bilateral jugular compression. Six milliliters of clear, slightly xanthochromic fluid was removed. Cerebrospinal fluid protein was 10 to 20 mg/100 ml. Blood studies revealed the hemoglobin to be 13 g/100 ml, the white blood cell count and differential were normal. The Kahn test was negative, and the blood sugar and blood urea nitrogen were within normal limits. Urinalysis showed no abnormalities.

**Course in Hospital** One month after admission to this hospital a laparotomy was done, at which time a firm mass 5 cm in diameter was excised from the tail of the pancreas. This specimen consisted of a fibrous walled cyst with calcification, external to which was a moderate amount of pancreatic acinar tissue showing minimal inflammatory and fibrotic changes. A diagnosis of fibrous cyst was made.

The patient was seen by a neurosurgical consultant, and at his suggestion a ventriculogram was recommended prior to attempting surgical laminectomy in an effort to alleviate the symptoms of central nervous system disease. A ventriculogram was carried out successfully, however, the patient became extremely restless following the procedure. Amytal Sodium (brand of mephobarbital sodium) was given. Respirations slowed to three to four per minute, and the patient became comatose and died about four and one half hours later.

## DISCUSSION

Doctor Aronson One is always tempted in dealing with a clinical problem to seek a common denominator which will explain diverse and seemingly unrelated findings In the case at hand that approach is too attractive to ignore In this protocol we are presented with a young woman who is afflicted with disease in several organs She has disturbed vision in her left eye which is apparently due to some congenital or perhaps familial disease in the globe as it has produced lifelong disturbance in vision associated with a vascular anomaly of the fundus

In addition we are told that she has a lesion of the cervical spinal cord There is ample evidence of this clinically and the marked sensory disturbance atrophy and weakness in the upper extremities and spasticity in the lower would strongly suggest that it is intramedullary tending to be somewhat right sided in location Further there apparently is irritation either of the phrenic centers in the cervical cord or perhaps of the visceral centers of the medulla It could be that the process extends upward to the medulla The additional findings of headache and ataxia suggest the possibility of a second lesion in the posterior fossa as a possible cause of the vomiting hiccoughing headaches and equilibratory disturbance which she exhibits One could predicate cerebellar lesion compressing the 4th ventricle and medulla and thus producing obstructive hydrocephalus and irritation of medullary centers The lack of involvement of the lowermost cranial nerves would suggest this possibility rather than that of an intramedullary process from the cord to the medulla because the latter would produce in all probability lower motor neuron involvement in the distribution of those nerves whose nuclei lie in the medulla There is little or no evidence in the protocol which would point to a supratentorial brain lesion as a cause of these findings

Finally we are told that a pancreatic cyst was found and removed at patoromy Although I may be going far afield it seems necessary to tie all the findings together into a single syndrome one of the so called macularoses Specifically I refer to the nosologic entity known eponymically as Lindau von Hippel disease Angiomatosis retinae was described by von Hippel<sup>1</sup> in 1904 One or both eyes may be affected One sees large tortuous veins which often contain bright red blood and are accompanied by a large artery which shows beading and variations in caliber The vessels lead to rounded nodules usually situated in the periphery of the retina and believed to be hemangioblastomas

Lindau<sup>2</sup> in 1926 established a relationship between cerebellar and retinal tumors He showed that a tumor histologically similar to that found in the retina could be found in the cerebellum These tumors were hemangioblastomas (occasionally known as hemangioendotheliomas) and were frequently cystic He pointed out that many lesions previously diagnosed as benign cysts or gliomatous cysts of the cerebellum were actually hemangioblastomas with a small mural nodule of tumor surrounded by a large cyst whose wall consisted of glia and that the tumor

nodule was often missed. In addition to the retinal lesions which occurred in relatively few cases there were not infrequently hemangioblastomas of the brain stem and spinal cord, epithelial cysts, angiomas and cystadenomas of the pancreas, cysts and angiomas of the liver, spleen and kidneys, tumors resembling hypernephromas of the kidney, paragangliomas and adenomas of the adrenals, cystadenomas of the ovaries, cysts of the epididymis, and in rare instances cutaneous nevi.

Significantly only a very few hemangioblastomas have been found above the tentorium. In this connection the embryologic work of Streeter<sup>2</sup> should be mentioned. He pointed out that the primitive vascular plexus differentiates slowly into arteries, veins and capillaries early in development, and that during this phase true vascular tumors might arise. Karlfors (quoted by Cushing and Bailey<sup>4</sup>) stated that during this same period a very rich vascular plexus consisting of undifferentiated capillaries exists in the posterior fossa and simultaneously a similar condition exists in the eye, thus possibly explaining the frequency of and association between lesions of the cerebellum and retina.

The disease is apparently inherited and seems to behave as a simple dominant characteristic. The onset is usually in childhood or early adult life. Wyburn-Mason<sup>5</sup> enlarged on the spinal cord involvement in the disease, mentioning that sites of predilection were the cervical and lumbar enlargements. Often he states there is an associated syringomyelic cavity which gives rise to the usual signs.

Of course the term syringomyelia is used somewhat loosely by many writers. It is not at all unusual for intramedullary tumors to be associated with large cystic cavities. These cavities usually contain fluid often indistinguishable from spinal fluid. At any rate clinically and myelographically, there appears to be a hemangioblastomatous cyst of the cervical cord in this case.

The spinal fluid protein is usually quite high in these cases of hemangioblastoma. The protocol tells us that the fluid is xanthochromic and the protein 10 to 20 mg/100 ml. I question the validity of these determinations and would be tempted to add a cipher to each. Incidentally Levin<sup>6</sup> states that in every case of Lindau's disease in which the cord was properly examined a spinal tumor was found.

The lesions of the abdominal viscera rarely produce symptoms. The tumors of the kidney that resemble hypernephromas are apparently not malignant. Polycythemia has been reported in several cases but apparently was lacking in this patient. Cramer<sup>7</sup> collected several of these cases and adduced histologic evidence for possible hematopoietic activity in some of these tumors. The cerebellar growths may often be removed unsuccessfully and the spinal and retinal lesions can occasionally be benefited by operation.

Finally our patient appears to have died a medullary death rather suddenly. There is a known propensity for these very vascular tumors to hemorrhage. One can only guess at the final incident but it seems likely that a sudden hemorrhage may have occurred within a hemangioblastomatous cyst of the cerebellum as a result of the upsetting of pressure relations incident to ventriculography.

#### Dr Aronsen's diagnosis

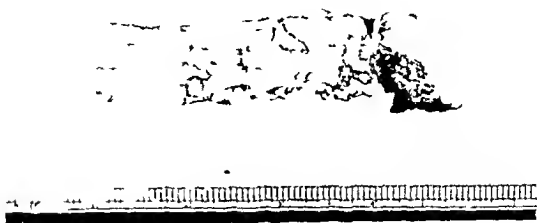
Lindau von Hippel disease with (1) angiomas of retinae left eye, (2) hemangioblastoma of cervical spinal cord probably cystic, (3) probable cystic hemangioblastoma of the cerebellum with obstructive hydrocephalus and possible terminal hemorrhage causing medullary failure and (4) cystic anomaly of the pancreas and possibly of other organs.

#### PATHOLOGIC FINDINGS

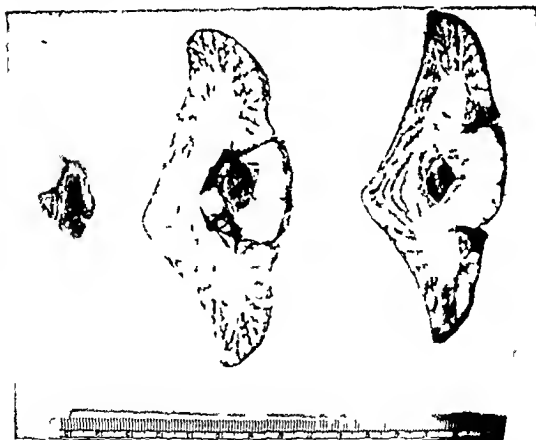
Doctor Witz: At autopsy cyanosis was visible and was most marked in the dependent portions of the body and at the extremities the fingers and toes. A well healed lower abdominal scar was present and the hair had been shaved from the scalp. No anomalies were visible. Two bur holes were present in the occipital bones one on each side.

The most important findings were those of the central nervous system. Lying over the right occipital region beneath the dura there was approximately 50 ml of recently clotted blood covering an area measuring 6 cm in diameter and 1.5 cm in thickness. The brain substance was depressed in the area of this hematoma. The other external vessels of the brain appeared normal. A yellowish brown tumor of firm consistency was present in the cervical cord (fig 1). This began just caudal to the 4th ventricle protruding slightly up into it and continued down through the pons and medulla into the first portion of the cervical cord. The entire tumor measured 4 cm in length and 2 cm in greatest diameter. In the region of the 4th ventricle it was solid and yellowish and contained blood. In the pons (fig 2) it was cystic bearing multiloculated spaces with thin walls and smooth linings filled with coagulated semiopaque grayish-white material. In the medulla solid yellow tissue was present. The cervical cord involved by the tumor showed necrosis and much of the tumor had sloughed away leaving a ragged cystic space. A small nodule of tumor was present on the anterior surface of the cervical cord. This nodule was solid and golden yellow.

No involvement of the cerebellum by tumor was seen nor were there any changes in the cerebrum itself. A few minute hemorrhages were present in the cerebrum scattered in several areas. These were interpreted as secondary to encephalography. Microscopic examination showed that the tumor itself consisted of a mixture of small vascular



*Figure 1 Cervical spinal cord showing the partially necrotic hemorrhagic lesion which is continuous with the one in the medulla and pons. The small discrete lesion on the anterior surface of the cord is shown farther toward the caudal end.*



*Figure 2 Coronal sections of the cerebellum and pons showing the location of the centrally placed hemangioma. Recent hemorrhage is present*



Finally our patient appears to have died a medullary death rather suddenly. There is a known propensity for these very vascular tumors to hemorrhage. One can only guess at the final incident but it seems likely that a sudden hemorrhage may have occurred within a hemangioblastomatous cyst of the cerebellum as a result of the upsetting of pressure relations incident to ventriculography.

#### Dr. Aronson's diagnosis

Lindau von Hippel disease with (1) angiomatosis retinae, left eye, (2) hemangioblastoma of cervical spinal cord probably cystic (3) probable cystic hemangioblastoma of the cerebellum with obstructive hydrocephalus and possible terminal hemorrhage causing medullary failure and (4) cystic anomaly of the pancreas and possibly of other organs.

#### PATHOLOGIC FINDINGS

Doctor Watts. At autopsy cyanosis was visible and was most marked in the dependent portions of the body and at the extremities the fingers and toes. A well healed lower abdominal scar was present and the hair had been shaved from the scalp. No anomalies were visible. Two bur holes were present in the occipital bones one on each side.

The most important findings were those of the central nervous system. Lying over the right occipital region beneath the dura there was approximately 50 ml of recently clotted blood covering an area measuring 6 cm in diameter and 1.5 cm in thickness. The brain substance was depressed in the area of this hematoma. The other external vessels of the brain appeared normal. A yellowish brown tumor of firm consistency was present in the cervical cord (fig. 1). This began just caudal to the 4th ventricle protruding slightly up into it and continued down through the pons and medulla into the first portion of the cervical cord. The entire tumor measured 4 cm in length and 2 cm in greatest diameter. In the region of the 4th ventricle it was solid and yellowish and contained blood. In the pons (fig. 2) it was cystic bearing multiloculated spaces with thin walls and smooth linings filled with coagulated semiopaque grayish-white material. In the medulla solid yellow tissue was present. The cervical cord involved by the tumor showed necrosis and much of the tumor had sloughed away leaving a ragged cystic space. A small nodule of tumor was present on the anterior surface of the cervical cord. This nodule was solid and golden yellow.

No involvement of the cerebellum by tumor was seen nor were there any changes in the cerebrum itself. A few minute hemorrhages were present in the cerebrum scattered in several areas. These were interpreted as secondary to encephalography. Microscopic examination showed that the tumor itself consisted of a mixture of small vascular

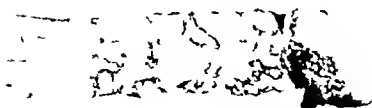


Figure 1 Cervical spinal cord showing the partially necrotic hemorrhagic lesion which is continuous with the one in the medulla and pons. The small discrete lesion on the anterior surface of the cord is shown farther toward the caudal end.

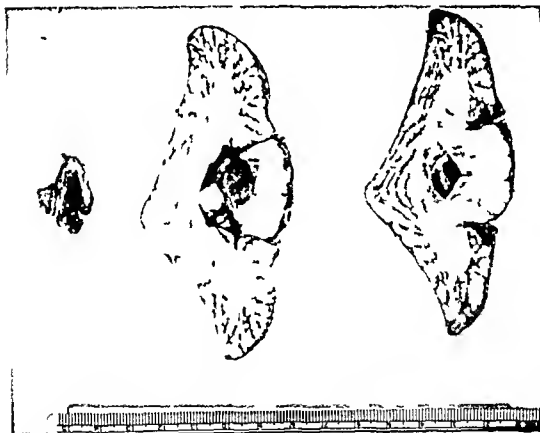


Figure 2 Coronal sections of the cerebellum and pons showing the centrally placed hemangioma. Recent hemorrhage

Finally our patient appears to have died a medullary death rather suddenly. There is a known propensity for these very vascular tumors to hemorrhage. One can only guess at the final incident but it seems likely that a sudden hemorrhage may have occurred within a hemangioblastomalous cyst of the cerebellum as a result of the upsetting of pressure relations incident to ventriculography.

#### Dr. Atkinson's diagnosis

Lindau von Hippel disease with (1) angiomas of retinae, left eye, (2) hemangioblastoma of cervical spinal cord probably cystic, (3) probable cystic hemangioblastoma of the cerebellum with obstructive hydrocephalus and possible terminal hemorrhage causing medullary failure, and (4) cystic anomaly of the pancreas and possibly of other organs.

#### PATHOLOGIC FINDINGS

Doctor Watts. At autopsy cyanosis was visible and was most marked in the dependent portions of the body and at the extremities the fingers and toes. A well healed lower abdominal scar was present and the hair had been shaved from the scalp. No anomalies were visible. Two burr holes were present in the occipital bones, one on each side.

The most important findings were those of the central nervous system. Lying over the right occipital region beneath the dura there was approximately 50 ml of recently clotted blood covering an area measuring 6 cm in diameter and 1.5 cm in thickness. The brain substance was depressed in the area of this hematoma. The other external vessels of the brain appeared normal. A yellowish brown tumor of firm consistency was present in the cervical cord (fig 1). This began just caudal to the 4th ventricle protruding slightly up into it and continued down through the pons and medulla into the first portion of the cervical cord. The entire tumor measured 4 cm in length and 2 cm in greatest diameter. In the region of the 4th ventricle it was solid and yellowish and contained blood. In the pons (fig 2) it was cystic bearing multiloculated spaces with thin walls and smooth linings filled with coagulated semiopaque grayish-white material. In the medulla solid yellow tissue was present. The cervical cord involved by the tumor showed necrosis and much of the tumor had sloughed away leaving a ragged cystic space. A small nodule of tumor was present on the anterior surface of the cervical cord. This nodule was solid and golden yellow.

No involvement of the cerebellum by tumor was seen nor were there any changes in the cerebrum itself. A few minute hemorrhages were present in the cerebrum scattered in several areas. These were interpreted as secondary to encephalography. Microscopic examination showed that the tumor itself consisted of a mixture of small vascular

area secondary to encephalography. Unfortunately, the eyes were not examined at autopsy. It was felt that the cause of death was respiratory failure secondary to mechanical pressure changes associated with hemorrhages in the cervical cord and medullary tumor and epidural hemorrhage in the region of the craniotomy.

This interesting case presents the findings of a disseminated defect involving the blood vessels and epithelial structures. It is believed by many that the vascular lesions of this defect are not true neoplasms nor are the epithelial dysplasias truly neoplastic. The term hamartoma has been used to categorize the vascular and epithelial changes and in this use implies that these are malformations in which the various tissues of the part are present in improper distribution or proportion, often with prominent excess of one particular tissue. Thus, since blood vessels are present in great numbers within the central nervous system and in the eye, the occurrence of vascular channels in these areas does not imply a neoplastic change. Also, such lesions designated as hamartomas do not possess disproportionate powers of growth, and though growth may be apparent for a period of many years, it reaches an ultimate conclusion. Apparent continued growth may represent simply the reaction of trauma or, in the case of vascular lesions, thrombosis or hemorrhage with resultant degenerative and edematous changes. It seems from the examination of the central nervous system lesion in this patient that the symptoms of exacerbation may well have resulted from such a vascular accident. Evidence of old and recent hemorrhage and necrosis were present. The epithelial lesions in this patient seemed even more likely to be malformations than neoplastic changes.

Doctor Erdbrink \* Doctor Aronson is to be complimented for his skillful evaluation of this very interesting case.

Ophthalmologists like to refer to angiomas of the retina as von Hippel's disease, and to angiomas of the central nervous system as Lindau's disease. Thus, the particular association of retinal and cerebellar hemangiomas is referred to as Lindau von Hippel disease, this being a congenital mesodermal malformation having neoplastic traits occurring in neuroectodermal tissue, the retina and the central nervous system.

Von Hippel's disease is relatively rare. It may be bilateral, if unilateral, the left eye may be slightly more frequently affected. It appears most commonly in the third decade of life, and there is a definite familial incidence.

Clinically, angiomas may be extremely pleomorphic, but there are stages of early vascular dilation and angiomatous formation, then hemorrhages, exudation, cyst formation, retinal detachment, and the

spaces and somewhat more solid areas of closely packed endothelial type cells. Pigment laden macrophages were present in the tumor tissue and in addition recent hemorrhage older hemorrhage and necrosis were also evident. Other portions those representing the grayish translucent cysts seen grossly consisted of larger spaces lined by endothelial cells and containing a coagulum of protein like material. The cellular makeup of the tumor was such that its origin appeared to be hamartomatous rather than actually neoplastic that is no evidences of malignant or invasive growth could be seen and the individual cells were of uniform structure. No other significant microscopic changes were seen in the central nervous system. The anterior lobe of the pituitary gland however did show several small areas of acute ischemic focal necrosis. The cause of this necrosis was not apparent from the examinations performed.

Other findings of interest were present in the abdominal viscera. The pancreas showed fibrosis of its body and tail and there were several small cystic spaces the largest measuring approximately 1 cm in diameter within its substance. Microscopic examination showed that these were lined by cuboidal and occasionally mucus type epithelium and surrounded by fibrous connective tissue. The islets and acinar structures of the pancreas appeared undisturbed. There was slight inflammatory infiltration in the areas of fibrosis. Slightly yellowish turbid fluid was present in one of these cysts. Other cystic structures contained dark bloodstained fluid. No obstructive change in the pancreatic duct system was found.

Both kidneys contained several small smooth walled cysts filled with clear fluid. The largest of these measured approximately 7 mm in diameter. A disk shaped scar which extended deep into the substance of the organ was present in the right kidney and measured 7 mm in greatest dimension. Microscopic examination of this area showed that immediately adjacent to the scar a small localized collection of cells with clear cytoplasm containing fine vacuoles and small evenly stained nuclei was present. These cells resembled those of the adrenal cortex. This was the only focus of such tissue found in the kidneys. The renal cysts were lined by a flattened to cuboidal epithelium. No angiomatic lesions were found in the abdominal viscera. A few small areas of focal cortical hyperplasia of the left adrenal gland were present. The urinary bladder was congested and its mucosa edematous. However it contained clear urine. No other significant abnormalities were discovered at the autopsy examination.

Review of the pancreatic tissue previously removed at operation revealed a structure similar to that of the lesions present in the pancreas at autopsy. The anatomic diagnoses then were (1) hemangioma of the cervical spinal cord the medulla and the pons (2) Lindau von Hippel syndrome consisting of a central nervous system angioma with pancreatic cysts renal cysts adenoma of the right kidney and angioma of the left eye (3) epidural hemorrhage over the right occipital

Doctor Strunk \* No films were available

Doctor Watts: A careful study<sup>7</sup> of the family history of a patient with this disease, by means of public records and written statements in family Bibles and covering a period of about nine generations, appeared in the *American Medical Association Journal* in recent months. It showed strikingly the familial and hereditary aspects, and also demonstrated the varied clinical manifestations.

We selected this case for presentation because it offered a consideration of an unusual and interesting disease. So far as practical implications are concerned, the participants have mentioned that while complete therapeutic success is unusual, definite benefit to the patient in the form of symptomatic relief may be obtained. An awareness of the nature of these lesions and of their hereditary occurrence may prove helpful in the detection and management of some of these patients.

#### Pathologic diagnoses

- 1 Hemangioma of the cervical spinal cord, the medulla, and the pons
- 2 Lindau von Hippel syndrome consisting of central nervous system angioma with pinneric cysts, renal cysts, and noma of the right kidney, and angioma of the left eye
- 3 Epidural hemorrhage over the right occipital region, secondary to oncophalography

---

Comdr William M Strunk MC, USA, Radiological Service

#### REFERENCES

- 1 von Hippel E. Ueber eine sehr seltene Erkrankung der Netzhaut. *Arch f Ophth* 59: 83-106 Aug 1904
- 2 Lindau A. Cysts in cerebellum structure pathogenesis and relations to neoplasia of retina. *Acta path et microbiol Scandinav* (Supp No 1) pp 1-128 1926 (In German)
- 3 Streeter G L. Developmental alterations in vascular system of brain of human embryo. *Contrib Embryol Carnegie Inst* 8: 7-38 1918
- 4 Cushing H B and Bailey P B. *Tumors Arising from the Blood Vessels of the Brain*, Angiomatous Malformations and Hemangioblastomas. Charles C Thomas Publisher Springfield Ill 1928 p 219
- 5 Wyburn-Mason R. Arteriovenous aneurysm of mid brain and retina (clinical, neural and mental changes). *Brain* 66: 163-203 Sept 1943
- 6 Levio P M. Multiple hereditary hemangioblastomas of nervous system. *Arch Neurol & Psychiat* 36: 384-391 Aug 1936
- 7 Cramer F and Kimsey W H. Cerebellar hemangioblastomas: review of 53 cases with special reference to cerebellar cysts and association of polycythemia. *A M A Arch Neurol & Psychiat* 67: 237-252 Feb 1952
- 8 Silver M L. Hereditary vascular tumors of nervous system. *J A M A* 156: 1053-1056 Nov 13 1954

final stage of glaucoma and ultimate functional destruction of the eye. Ophthalmoscopically the typical stage of the disease exhibits a cystic tumor in the peripheral retina with greatly dilated vessels running out to feed it. The course of the disease is relatively slow but the progression is relentless.

Therapeutic efforts in angiomatosis retinae consist of electro-surgery and x ray radiation. The prognosis is poor unless the disease process is treated extremely early in its course.

Doctor Watts: Does any retinal angioma mean von Hippel's disease?

Doctor Erdbrink: No. Congenital tortuosity and dilatation of the retinal vessels, an arteriovenous aneurysm of the retinal vessels, a circumscribed capillary hemangioma of the retina, and Coats's disease (massive exudative and hemorrhagic retinitis) must be considered in the differential diagnosis. A cavernous hemangioma of the optic disk should not be confusing, nor should the choroidal angioma of the Sturge-Weber syndrome.

Doctor Aronson: In my experience it is unusual to see angiomatosis retinae with angioma of the nervous system. That is most cases of central nervous system angiomas do not show retinal angiomas.

Doctor Romanul: I should like to differ with Doctor Aronson. I have seen several patients with central nervous system hemangioma in whom no retinal lesion was seen before operation. After operation, however, when the diagnosis had been established, careful funduscopic study showed peripherally located hemangiomatous lesions. I believe that due to the unfortunate habit of most neurologists and neurosurgeons to limit their funduscopic examination to the disk and sometimes also the macula, many peripherally situated hemangiomas are not seen. It is difficult therefore to estimate the incidence of retinal lesions in any particular series.

Doctor Aronson: My experience and the literature show a rare association of the two lesions. Perhaps many of the reported cases were examined only by neurologists and neurosurgeons and without the use of a cycloplegic agent. This would account for missing some of the less conspicuous peripheral lesions. I am sure that a competent ophthalmologist can see many things a neurologist might overlook.

Doctor Turville: What does surgery offer in these cases?

Doctor Aronson: Decompression procedures may give long relief. These are not malignant lesions. The patient under discussion here would have done better with earlier decompression.

Doctor Cooper:

Are there any x rays on this case?

Lt. Flavius C. Romanul, MC, USNR, Neurologist, Naval S. C.  
 Commander W. H. C. Turville, MC, USN, Surgeon, Naval S. C.  
 Captain Robert A. Cooper, MC, USN, Ensign, Officer

By and large the psychotic population, as I encountered sample of it, is being managed in an inefficient fashion. The physical facilities of the various hospitals provide inadequate closed ward accommodations. I was impressed by the measures taken to provide security for these patients. Their design, for the most part, has been improvised from existing physical facilities, employing local material and labor. In the face of this somewhat restricted choice, the responsible medical officers had to house their psychotic patients in physical settings which, if anything, tend to overemphasize the physical security aspects. Window guards, furniture, and doors tend to resemble maximum security installations such as prisons, and hence are somewhat depressing. It should be emphasized that this has not been by planned design, and the psychiatrists and the administrative medical officers are conscious of the inherent esthetic and therapeutic deficiencies. The point to be made is one for future planning, namely, that a therapeutic atmosphere is conducive to treatment. The patient and the staff both feel it and are encouraged by it. The converse is equally true.

Data have been accumulating lately which tend to show substantially that there are very potent therapeutic forces active in the physical and social situation of a mental hospital ward. Those lead to therapeutic advantage or disadvantage dependent upon their recognition by the responsible medical group. Acting out in the form of assaultive, destructive behavior or suicidal attempts or gestures or escape maneuvers may be encouraged or discouraged by the implications of the prevailing attitude. In those institutions where trust and respect of psychotic patients is explicit in the physical structure as well as the demeanor of the attending personnel, there is a gratifying low incidence of the disturbance colloquially thought to be characteristic of the insane. Obviously the Army hospitals which I saw were limited in this regard.

It has been contended with what appears to be irrefutable logic that unless there is a relatively immediate prospect of restoring a soldier to some kind of duty status, his definitive medical care and ultimate rehabilitation is the job and responsibility of the Veterans Administration. This policy is a clear, simple, and sensible one based on the thesis of division of medical responsibility among various governmental agencies so charged. The military establishment has a vital duty which should not be jeopardized by encumbering its facilities and personnel with obligations which can be discharged by other divisions of the Federal Government. Admittedly, it is a difficult task to draw a sharp line of distinction between the medical obligations which are properly the military's and those which are civilian agencies', however, since this becomes important only after the patient has left a theater of operations such as Europe, it is beyond the purview of this report.



## SERVICE ARTICLE

# PSYCHIATRIC PROBLEMS IN U S ARMY INSTALLATIONS IN EUROPE

HOWARD P. ROME, M.D.

THE military psychiatrist's job in a very important measure is concerned with dispositional activities. However, a psychiatrist's training conditions him to think almost automatically in terms of the best interests of the patient. These are often in contrast to the needs of a military organization whose standards are those of readiness for combat. There inevitably results from this discrepancy of goals conflict as to procedure despite directives regulations and the rest. It is incumbent upon a Psychiatrist Consultant to reconcile these disparate aims by frequent discussions and consultation. The problem is of sufficient magnitude to make such a task a full time job.

The reports of Civilian Psychiatric Consultants which I have been privileged to review have surveyed all of the roles of the psychiatrist medical officer as well as the kinds of problems with which he is confronted. There is little which I can add to them but it occurs to me that many of them are expressions of situations which can be understood best if they are couched in the sociologic context in which they occur.

## THE PROBLEM OF THE PSYCHOSES

There is a fixed incidence of frank psychoses which occurs in our military population. For example, 22 to 25 per thousand troops per annum. It is very unlikely that the benefits gained from even excellent mental hygiene programs will change this annual rate of psychoses despite the unquestioned benefit which accrues from them in other spheres. Granted that preliminary screens tend to filter out the overt psychoses, it follows that a rather remarkably fixed annual rate of these problems will require appropriate diagnosis, management and disposition. The facilities necessary for their adequate handling can be predicted from existing demographic data. Detection and separation through medical channels is the standard operating procedure.

Extracted from a report to the Surgeon General U.S. Army, 1st of the  
Army Medical Institute in Europe, made in September 1954.  
Doctor Rome at the Mayo Clinic, Rochester, Minn. He is a Consultant  
Surgeon General Department of the Army in Psychiatry and Neurology.

make up unfits him for military service except in certain extremely protected situations continues to baffle many. The basic nature of this problem eludes many of the less experienced psychiatrists. By the same token, company commanders fail to recognize these persons for what they are and the result is a virtual shuttle of the patient from duty to the hospital and back, with all that that implies. It is significant that in those installations staffed by the more experienced medical officers, who naturally establish a working liaison with the line officers whose troops they serve, this problem is negligible.

### PSYCHIATRIC HOSPITALIZATION VERSUS OPD MANAGEMENT

It was gratifying to see that on the whole considerable care is exercised in selecting patients for admission to the psychiatric wards. This shows not only a high degree of psychiatric therapeutic sophistication but also indicates a noteworthy educational achievement. The concept that psychiatric illness is an expression of a decompensation in the adaptive resources of a patient is one which takes many factors into consideration. Further, it emphasizes the functional, dynamic aspects leading to the symptomatic state in contrast to the older static idea which tended to overstress the immediate, current, descriptive expressions of disease in a sense analogous to organic disease. Fitness for duty in this enlightened concept of psychiatric function can be seen as a relative phenomenon, a composite of the resources and potentialities of the patient and the stressful circumstances of the situation in which he finds himself.

It was my impression that there is a prevailing tendency among the psychiatrists in this theater of operations to be less bound by descriptive, nosologic labels which heretofore have carried with them dispositional edict qualities. One gains the impression that on the whole there is a concerted effort to keep patients referred for consultation and possible psychiatric hospitalization on an active duty status if it is at all feasible. Along with this, there is considerable interest on the part of these medical officers to reinforce this decision with provisions for continuing outpatient psychotherapy. Supplemental to this, they feel encouraged to use the ancillary resources at their disposal to accomplish these desirable objectives: consultation with company commanders, suggestions as to duty assignments, and use of chaplain and social service facilities. The encouragement of this is strongly recommended. As a corollary, the creation of some standard on which suitability for treatment may be based is also recommended. This would enable the medical officer to spend that time available for outpatient department psychotherapy more equitably from the point of view of its potential worth to the Army.

In theaters of operation such as Europe, the hospitals of necessity have to have provisions for the care and treatment of the psychotic. The creation of a neuropsychiatric center as an area clearing house such as the one at Landstuhl streamlines the handling of those patients who for the most part cannot be returned to duty.

The criterion for disposition or return to duty should be based on an estimation of the immediate future effectiveness of the patient as a soldier, and not upon the established psychiatric diagnosis alone. It is well documented that a significant percentage of patients with frank psychoses can be returned to an effective status provided the complex organization of various services required for this are integrated appropriately.

There are additional compelling reasons which recommend this policy.

1 The concept that a diagnosis of psychosis per se is synonymous with separation from the service is extravagant both economically to the nation and medically to the individual. Unfortunately, this idea has prevailed for some time. It is based in part upon the attitude of hopelessness with which many persons view all psychiatric illness. Co-ordinated line and staff policies and actions and improved communication of these among the persons concerned can restore a number of these patients to effective duty.

2 A military medical establishment which concerns itself only with diagnosis and disposition tends to deteriorate professionally. It cannot attract and keep well trained competent physicians. Accordingly failing in this sphere its other medical and military services deteriorate commensurately.

3 Medical administrative policies other than this have a demoralizing influence upon military personnel in general for in efforts to rectify the individual instances of the injustice with which they are personally familiar there is created a spreading tendency to circumvent regulations and directives conceived of as rigid and unrealistic by individualized interpretation which tends in turn to make a travesty of policy in general.

4 The most effective policy is one that defines and sets relatively broad limits and allows for the executor of it to use his discretion and judgment. Its emphasis is permissive rather than prohibitive. This ensures full participation and grants authority as well as responsibility.

#### SEPARATION PROCEDURES

The authority for the administrative separation of unfit personnel is clearly defined by pertinent Army regulations. The problem of the so-called pseudoneurotic schizophrenic whose characterologic

make up unfits him for military service except in certain extremely protected situations continues to baffle many. The basic nature of this problem eludes many of the less experienced psychiatrists. By the same token, company commanders fail to recognize these persons for what they are and the result is a virtual shuttle of the patient from duty to the hospital and back, with all that that implies. It is significant that in those installations staffed by the more experienced medical officers, who naturally establish a working liaison with the line officers whose troops they serve, this problem is negligible.

### PSYCHIATRIC HOSPITALIZATION VERSUS OPD MANAGEMENT

It was gratifying to see that on the whole considerable care is exercised in selecting patients for admission to the psychiatric wards. This shows not only a high degree of psychiatric therapeutic sophistication but also indicates a noteworthy educational achievement. The concept that psychiatric illness is an expression of a decompensation in the adaptive resources of a patient is one which takes many factors into consideration. Further, it emphasizes the functional, dynamic aspects leading to the symptomatic state in contrast to the older static idea which tended to overstress the immediate, current, descriptive expressions of disease in a sense analogous to organic disease. Fitness for duty in this enlightened concept of psychiatric function can be seen as a relative phenomenon, a composite of the resources and potentialities of the patient and the stressful circumstances of the situation in which he finds himself.

It was my impression that there is a prevailing tendency among the psychiatrists in this theater of operations to be less bound by descriptive, nosologic labels which heretofore have carried with them dispositional edict qualities. One gains the impression that on the whole there is a concerted effort to keep patients referred for consultation and possible psychiatric hospitalization on an active duty status if it is at all feasible. Along with this, there is considerable interest on the part of these medical officers to reinforce this decision with provisions for continuing outpatient psychotherapy. Supplemental to this, they feel encouraged to use the ancillary resources at their disposal to accomplish these desirable objectives: consultation with company commanders, suggestions as to duty assignments, use of chaplain and social service facilities. The use of the latter is strongly recommended. As a corollary, a standard on which suitability for treatment is recommended. This would enable the medical officer to estimate the time available for outpatient department treatment equitably from the point of view of its use.

In theaters of operation such as Europe the hospitals of necessity have to have provisions for the care and treatment of the psychotic. The creation of a neuropsychiatric center as an area clearing house, such as the one at Landstuhl streamlines the handling of those patients who for the most part cannot be returned to duty.

The criterion for disposition or return to duty should be based on an estimation of the immediate future effectiveness of the patient as a soldier and not upon the established psychiatric diagnosis alone. It is well documented that a significant percentage of patients with frank psychoses can be returned to an effective status provided the complex organization of various services required for this are integrated appropriately.

There are additional compelling reasons which recommend this policy:

- 1 The concept that a diagnosis of psychosis per se is synonymous with separation from the service is extravagant both economically to the nation and rediculously to the individual. Unfortunately this idea has prevailed for some time. It is based in part upon the attitude of hopelessness with which many persons view all psychiatric illness. Co-ordinated line and staff policies and actions and improved communication of these among the persons concerned can restore a number of these patients to effective duty.

- 2 A military medical establishment which concerns itself only with diagnosis and disposition tends to deteriorate professionally. It cannot attract and keep well trained competent physicians. Accordingly failing in this sphere its other medical and military services deteriorate commensurately.

- 3 Medical administrative policies other than this have a demoralizing influence upon military personnel in general. For in efforts to rectify the individual instances of the injustice with which they are personally familiar there is created a spreading tendency to circumvent regulations and directives conceived of as rigid and unrealistic by individualized interpretation which tends in turn to make a travesty of policy in general.

- 4 The most effective policy is one that defines and sets relatively broad limits and allows for the executor of it to use his discretion and judgment. Its emphasis is permissive rather than prohibitive. This ensures full participation and grants authority as well as responsibility.

#### SEPARATION PROCEDURES

The authority for the administrative separation of unfit personnel is clearly defined by pertinent Army regulations. The problem of the so-called pseudoneurotic schizophrenic whose characterologic

## MORALE

The morale of the military forces as reflected in the sample of medical officers whom I met requires discussion. It is not an easy job to assess the morale of any organization, much less one the size and complexity of the United States Army. There always is a tendency to reductionism and oversimplification which ascribes more importance to a few obvious elements than they deserve.

Hanson W. Baldwin, the military affairs analyst for the *New York Times*, recently observed that the morale of the military forces was at "its lowest point in the 25 years" of his firsthand knowledge of it as a reporter. His discussion went on to include a number of the factors which I also noted in my brief and limited contact. It is significant that at the relatively high level of medical officers, one senses the same things which Baldwin indicated are true for the entire military establishment. While certain problems are peculiar to medical officers, it is also true that they too are influenced by the same set of sociologic forces which operate on the Army as a whole.

First, it is evident that—as Baldwin also points out—one must distinguish between the hard core of regular Army and the larger reserve component which finds itself in uniform for a limited time. While not the most paramount, the economic factor is certainly important. This is particularly true of regular officers in the grades of Major, Lieutenant Colonel, and Colonel. The material rewards of a professional life in the service are distinctly below what these men are entitled to, deserve, and could earn as civilians. While they are expected and indeed required to live on a social scale commensurate with their rank, they are not given the wherewithal with which to maintain this, educate their families, entertain as they deem it fit and are required to, and provide insurance for their families. This is made the more intolerable by the disparity which exists between them and their civilian colleagues in positions of comparable authority and responsibility. Then also the perquisites have been whittled down progressively.

The policy has been to create incentives for the lower ranked officers, and while this in itself is fine, unless similarly scaled advantages exist for officers who elect this as a permanent career, the country will be faced with a dearth of trained, experienced, higher echelon leaders. Resignations from the service by higher ranked officers is too high at present, as is generally recognized, however, the reasons for this are not fully appreciated. Medical officers in particular now have available to them civilian positions with emoluments far beyond those which they can hope to achieve by remaining permanently in military service. The effect of this upon their wives and families has to be reckoned with, for therein lies a major source of potential dissatisfaction.

The net result of this activity has been that the census on the inpatient hospital services in most installations is at a minimum. Those patients who are admitted are there for evaluative studies or because a trial of duty has shown conclusively their medical unfitness or because of complicating factors that clearly warrant hospitalization.

I found few installations with statistical data which truly reflect the large amount of this kind of work being done unless the patient is formally admitted to the hospital. He does not appear on the daily records as a patient. Obviously efforts in this direction are very rewarding. They result in a much higher quality of psychiatric care and service than is officially evident in regular hospital reports. A more accurate appraisal of work actually done would be had from some inclusion of these data in the regular forms that are officially submitted.

Then too it must be evident that this function employs psychiatrists at their most efficient level. Their professional acumen and therapeutic skill is enhanced commensurately at the same time that the patients and their units benefit from the use of even partial services. In a peacetime military establishment particularly this procedure has much to recommend it.

#### PSYCHIATRIC MEDICAL OFFICERS

The large majority of medical officers assigned to the psychiatric services of the installations I visited had had some graduate training in psychiatry before entering on this tour of duty. The Chiefs of the services of the larger hospitals are board certified or eligible by virtue of specialized training they have received. Those officers with more junior status expressed keen interest in ultimately qualifying for specialty certification. This as I see it attests a degree of motivation which can only reflect beneficially upon their patients. Accordingly staff conferences and more or less formal reviews of current literature as well as the actual collection and recording of psychiatric data are entered into in a highly satisfactory manner. The conferences I was privileged to attend were the equal of any I have witnessed in the better civilian teaching institutions.

Within the limitations of time and resources permitted by the fact that they are in the Army it was my feeling that the quality of individual patient care being given was of a high order. However with almost no exception these very capable young officers all plan to leave the Army at the conclusion of their obligated period of service. Also it can be anticipated that in the future the level of preliminary training by officers assuming these responsibilities will be lower than those now serving and hence their skill proportionately less.

young male adults who are not engaged in actual combat with an enemy, but also their dependents—wives and young children. Consequently, the burden imposed by the medical care of these dependents has to be reckoned with. As is true of women in the most fertile time of their childbearing, in only marriage and when they are relatively young, there are a host of medical, obstetric, gynecologic, and psychiatric problems that occur among them. I have no information which would lead to the conclusion that these are disproportionate. By the same token, however, the whole complex of pediatric and developmental problems of dependent children is also the Medical Service's responsibility.

While I am sure that these are self-evident facts, I have the impression that for reasons not within the control of the Medical Service they tend to be subordinated in importance. The medical officer in general is expected to wear three hats: the first, as a general practitioner with a burgeoning family medical practice, the second, as a field medical officer familiar with and capable of dealing with the problems of an army in the field, and the third, as a competent specialist in one or the other of the many specialized fields in medicine, who is expected to function as he would were he in a teaching hospital. While this summary statement obviously requires modifications and amendments to be wholly accurate, it suffices to point up some of the ramifications and complexities of the medical officer's job. Each facet demands progressively more, in order to more adequately and more completely do the job with which it is concerned. This takes time, training, and leadership, as well as people, and yet it is all couched within the framework of personnel ceilings, military strategy, domestic and foreign political implications, limited medical manpower resources, and financial restrictions.

The solution of the conflicts among these often conflicting demands is neither immediately apparent nor easy, but has to be sought after by everyone involved, this includes many civilian groups whose tendency it has been to divest themselves from responsibility and content themselves with special pleadings for special interests.

### CONCLUSIONS

It is manifest that any brief encounter such as mine with problems of the order of magnitude such as those confronting the Medical Service in its European theater is hardly sufficient on which to even entertain an opinion. My respect for the job being done and the people doing it has grown immeasurably as a consequence of this limited view of their operations. Further, this opportunity has made me more conscious of my obligations and responsibilities as a citizen, a physician, and a teacher.



While some recognition of this is indicated by the additional pay given to medical officers it is not enough. The factors of status and prestige have to be thought of. By tradition promotions in the Medical Service are geared to line requirements. It has been demonstrated in various states as well as civilian Federal agencies that trained medical personnel have to be paid salaries at a higher level than other civil service positions of comparable status if good medical service is to be had. For example, while the Governors of several midwestern states receive salaries averaging \$15 000 per year the subordinate position of Commissioner of Mental Health in their states carried with it a salary of from \$18 000 to \$20 000 per year. While it may be hoped that Congress will rectify the relatively low pay scale of the military efforts should also be made to free what seems to be an encumbered promotion policy.

Since World War II particularly the military establishment has recognized the rightful place of medical specialists. However in the higher ranks at a time when maximum returns may be expected from long term professional investments it is still necessary for highly trained medical officers to assume full time administrative responsibilities for which they may or may not be suited and especially trained if they are to remain in a favorable competitive position in the promotion scale. This seems to be a wasteful expedient. One outstanding consequence from a morale point of view is the rivalry created between those officers who have had specialty training and those who by election or necessity have chosen administrative careers.

The policies of various high level advisory groups also affect the job of the Medical Service as a whole as well as its individual officers. Medical staffing patterns seem to be based on troop strength while the demand for medical services is on the realistic basis of troops plus their dependents. In many instances the tax which this imposes is expressed in terms of widespread dissatisfaction by the physician as well as his patient both of whom feel victimized by "the system."

### THE MEDICAL OFFICER'S JOB

In its widest angle perspective an appreciation of the medical officer's job takes in a great deal far beyond the scope of the actual technical practice of medicine. As I saw it and as I am capable of judging it the actual quality of medical service being given patients is of a superior kind.

As I have mentioned previously the staffing ratios of assignments of medical officers to the theater is on the basis of total military strength. It happens however that these officers not only serve a reasonably well selected physically healthy group of

disordered liver function, such as increased prothrombin time and hyponalbuminemia, are not present (5) Specific pathologic changes of the liver are observed. Grossly, the liver is dark brown to black. The consistency may be firmer than normal. Microscopically, there is a coarsely granular brown pigment in the hepatic cells. This is most marked near the central vein and in the central two thirds of the lobule. There is pigment in the Kupffer cells in some cases. The nature of this pigment is unknown, but is reportedly similar to the lipochromes.<sup>11</sup> This entity was described independently in 1954 by Sprinz and Nelson.<sup>12</sup> Since then a number of reports of cases have appeared in the literature.<sup>13-15</sup> It is considered likely that this is a definite pathologic entity, probably different from constitutional hyperbilirubinemia.

We should like to report another case of Dubin Johnson syndrome, proved by liver biopsy and with a familial occurrence (by history).

### CASE REPORT

A 22 year old soldier was admitted to this hospital in November 1955 because of icterus, fatigue and nausea and vomiting of three to four days duration.

**Past History.** The patient stated that he had noticed yellow color in his eyes since the age of 12. This had waxed and waned repeatedly. At the age of 18 he suffered from malaise, nausea and vomiting and increase in his jaundice. A diagnosis of hepatitis was made. He improved gradually over a period of 3 to 4 months. At the age of 19 years shortly after entering college he was operated on for acute appendicitis. The surgeon told the patient that his tissues were yellow at operation. Postoperatively he developed deep jaundice. Liver tests were performed for the first time and a diagnosis of "recurrent hepatitis" was made. Convalescence again took 3 to 4 months. For the next two years the patient attempted working at several jobs and he once more entered college. Each endeavor was terminated because of weakness, fatigue and lack of energy.

He was drafted in June 1955 at the age of 22 years. He felt fairly well during basic training but shortly thereafter he once more became very fatigued and weak. He developed a "funny pulsating feeling" in the right upper quadrant, nausea, vomiting and increased icterus and was admitted to the hospital for study.

**Family History.** Family history revealed that the patient's father, age 47 years, had suffered from chronic jaundice and had been told that he had "chronic hepatitis." One sister, 23 years of age, also had "chronic hepatitis." Both were fatigued but were able to work regularly, (as

train brakeman and school teacher respectively) Another sister 18 years of age was normal

Physical Examination. The patient was a well-developed and well nourished young man His temperature was 99.4°F pulse rate 80 blood pressure 115/75 mm Hg and respirations 22 per minute The scleras were icteric the skin was not thought to be jaundiced Physical examination was otherwise entirely negative At no time was either the liver or spleen palpated

Laboratory Studies White blood cell count was 7 800 per  $\mu$ l with a differential of 59 polymorphonuclear leukocytes 28 per cent lymphocytes 8 per cent monocytes and 5 per cent eosinophils Hematocrit was 44 ml per 100 ml sedimentation rate 9 mm at the end of the first hour The direct bilirubin was 2.8 and the total bilirubin 4.0 mg per 100 ml The sulfobromophthalein sodium retention was between 8 and 15 per cent Cephalin cholesterol flocculation varied from 1 to 2 at 48 hours thymol turbidity from 1.5 to 4.4 units at 48 hours Bile was present in the urine and urine urobilinogen was 1.40 Prothrombin time was 100 per cent of normal Total protein was 6.5 grams per 100 ml with albumin globulin ratio of 3.6:2.8 Alkaline phosphatase was 4 units cholesterol was 283 mg per 100 ml with 70 per cent of the total as esters Reticulocyte count was less than 1 per cent of the erythrocyte count Coombs test was negative

Röntgenographic findings of the chest were negative Cholecystograms failed to demonstrate gallbladder filling

strong familial history of jaundice, the patient's story of recurrent icterus for several years, malaise, normal hemogram, and borderline normal liver function point strongly to the diagnosis of Dubin Johnson's syndrome or the separate entity known as constitutional hyperbilirubinemia. It is stressed that at present the two entities are thought to be distinct, both pathologically and clinically, the former having both an elevated total and direct serum bilirubin with the characteristic pigment in the liver. A review of the literature indicates that the hereditary factor is not nearly as evident in Dubin Johnson's syndrome as in constitutional hyperbilirubinemia.

In the differential diagnosis, subacute hepatitis or postnecrotic cirrhosis of chemical or viral cause should be considered. In these diseases an enlarged nodular liver and positive flocculation studies indicate a pathologic as well as functional change found in the liver. The liver is not significantly enlarged nor are the flocculation studies typically positive in the syndromes considered in this article.

The minimal jaundice, right upper quadrant discomfort, fever, and roentgenographic evidence of a poorly or nonfunctioning gall bladder may lead to the erroneous diagnosis of primary gall bladder or bile duct disease. The history and liver biopsy demonstrating the abnormal pigment would be diagnostic of hepatic dysfunction of the Dubin Johnson type. In constitutional hyperbilirubinemia, the gallbladder may be seen in the cholecystogram.

The hepatic dysfunction syndromes ordinarily should not be confused clinically with a hemolytic process of a hereditary or acquired type, because the hemogram, red blood cell fragility study, Coombs' test, and reticulocyte determinations are well within normal limits. Also, in hemolytic disease, the spleen is frequently palpable.

Needless to say, the cause of hepatic dysfunction of the Dubin Johnson type or of constitutional hyperbilirubinemia is unknown. A hereditary factor is probably important, particularly in the latter condition. The conditions seem to be more prevalent in men than in women. It is remarkable that the pigment peculiar to Dubin Johnson's syndrome has not been described at post mortem examination heretofore.<sup>13</sup>

No specific treatment is known at present. Cortisone has been tried in constitutional hyperbilirubinemia without success.<sup>14</sup> The rationale of this therapy was based on the fact that corticosteroids are known to decrease jaundice in acute viral hepatitis.

Prognosis in both types of hepatic dysfunction is considered to be good with respect to life expectancy. Certainly, the symp-

toms of a recurrent nature can limit an individual's activity at least temporarily and may impose permanent physical limitations. From the cases studied to date subsequent irreversible liver cell damage in later life has not been demonstrated.

## SUMMARY

The Dubin Johnson syndrome is believed to be a distinct disease entity in which there is hyperbilirubinemia manifested clinically as in form of chronic or intermittent jaundice. Histologically the disease is characterized by the presence of a coarsely granular brown pigment in the hepatic cells. The usual symptoms are abdominal pain, nausea and fatigue. Jaundice, dark urine and slight enlargement of the liver are usually present. The jaundice is aggravated by intercurrent illnesses and fluctuates in intensity. The prognosis is good.

The disease differs from constitutional bilirubinemia in that (1) the symptoms are more prominent (2) the liver is frequently palpable (3) bilirubinemia is more severe and the serum bilirubin gives primarily a direct van den Bergh reaction (4) bilirubinuria is more common (5) liver function tests such as sulfobromophthaloin sodium excretion cephalin cholesterol flocculation, and turbidity tests may be abnormal (6) the gallbladder may not be seen in a cholecystogram and (7) there are specific pathologic changes in the liver.

The diagnosis of Dubin-Johnson syndrome in the patient described in this report was proved by liver biopsy. History disclosed a familial occurrence.

At present the primary importance of this syndrome is that it be accurately differentiated from (1) chronic and subacute hepatitis in order that the patient may be assured of a good prognosis and from (2) obstructive jaundice in order that unnecessary surgical procedures may be prevented.

## REFERENCES

- 1 Gilbert A and L. r b ullet P La ch l m i mple f m il l *Semana med.* 21 241 243 1901
- 2 D m h k w and S i g r k Famil l n abem lyti i nd e const tuti al h p t i c dy functi w rh indu ct van d n Bergh r ctio *Arch Int M d.* 67 259-285 Feb 1941
- 3 Comf rt M w n d H y n R M C r t u t o n l h p t c dysfunct cl l study f 35 c *Gastroenterology* 3 155 162 Sept 1944
- 4 M l ngr hr E R ew f chr i int mnt t juv nil jaundic *Quart J Med.* 16 83-98 Apr 1947
- 5 Ean r M P and Br k l B C r t u t o n al hyp bilirubinemi us diff renti f diagn s nd ff ct of stern d th r py *New England J Med.* 253 1062 1065 Dec 15 1955
- 6 Baroody w G and Shugart R T Famil al on h m lyt c icter *Am. J Med.* 20 314 316 Feb 1956.

7 Dubin I N and Johnson F B Chronic idiopathic jaundice with unidentified pigment in liver cells new clauicopathologic entity with report of 12 cases *Medicine* 33 155 197 Sept 1954

8 Sprinz H and Nelson R S Persistent nonhemolytic hyperbilirubinemia associated with lipochrome like pigment in liver cells report of 4 cases *Ann Int Med* 41 952 962 Nov 1954

9 John G G and Knudtson K P Chronic idiopathic jaundice 2 cases occurring in siblings with histochemical studies *Am J Med* 21 138 142 July 1956

10 Case 41341 (Case Records of the Massachusetts General Hospital Section) *New England J Med* 253 335 339 Aug 25 1955

11 Klajman A and Efrati P Prolonged jaundice with unidentified pigment in liver cells *Lancet* 268 538 539 Mar 12 1955

12 Campbell M Kolars C P Coe J I and Hoffbauer F W Dubin-Johnson syndrome in elderly men report of 3 cases (Abstract of paper presented at the Sixth Annual Meeting of the Association for the Study of Liver Diseases Chicago Ill Nov 3 1955) *Am J Med* 21 133 134 July 1956

13 Anderson W A D (editor) *Pathology* C V Mosby Co St Louis Mo 1948 p 865

### HELPING THE DISTURBED

"The main characteristic of mental ill health is inability to bear experience. The condition which takes the distressed human being to the psychiatrist is fundamentally the same as that which takes him to the priest or to the philosopher and it is legitimate and important to compare what each has to offer to the disturbed mind.

"The psychiatrist today is equipped as doctors fifty years ago were not with techniques for uncovering the origin and nature of mental stress with theories to mitigate its unbearable quality and with drugs to blunt its physical effects. He is less well equipped with means physical or psychological for raising the threshold of what can be borne with impunity.

—SIR GEOFFREY VICKERS V C M A  
in *Lancet*  
p 523 March 12 1955

# Constitutional Hepatic Dysfunction

NICHOLAS H. ZELLER *Captain MC USA*  
GERD SCHLEEFE *MD*

THE icteric condition which today is recognized as constitutional hepatic dysfunction or familial nonhemolytic jaundice was first described by Gilbert and his associates<sup>1</sup> during the early 1900's, and called *cholemie simple familiale*. Pozendaal, Comfort, and Saell<sup>2</sup> in an analysis of cases of slight and latent jaundice included instances of familial nonhemolytic nonobstructive jaundice.

Subsequent reviews of the condition were published by Comfort<sup>3</sup> and Comfort and Hoyne<sup>4</sup> who delineated the criteria for diagnosis and included a clinical study of 35 cases. It was stressed that the jaundice is not due to disease of the blood, liver, or biliary tract, but apparently is caused by an abnormally high threshold for excretion of bilirubin formed at the usual rate. This was attributed to an inborn deficiency of the hepatic cells with respect to the excretion of bilirubin. Comfort proposed the term constitutional hepatic dysfunction as best indicating the nature of the condition and the organ involved. In 1941 Meulengracht<sup>5</sup> reported 35 cases of chronic intermittent jaundice which conformed to the entity under discussion.

The sole manifestation of the condition is jaundice, which may become apparent at any age and which may be intermittent or persistent. It is usually familial but cannot always be demonstrated to be so. When familial it is believed that the condition is inherited as a dominant Mendelian trait which may be carried by either sex.<sup>7</sup> It is not common but the exact incidence has not been determined. The elevated blood bilirubin is always indirect reacting. In 1941 Dameshek and Singer<sup>6</sup> reported a greatly delayed excretion of injected bilirubin during bilirubin excretion tests in two families with familial nonhemolytic jaundice.

Constitutional hepatic dysfunction apparently does not produce symptoms but it is usual for individuals with the condition to complain of neurasthenia and fatigability.<sup>1-3, 7</sup> Emotional stress has also been related to appearance or exacerbation of icterus in affected individuals.

---

From U. S. Army Hospital 8212, Berlin, Germany. Dr. Zeller is now at 1113 E. St. Cherokee, Springfield, Mo.

The diagnosis is usually one of exclusion. Initially, following the report of an elevated indirect reacting bilirubin, the patient is usually thought to have hemolytic disease. This can be excluded by history, a normal appearing bone marrow, an absence of anemia, reticulocytosis and splenomegaly, normal size, shape, and osmotic fragility of erythrocytes, a negative Coombs' test, a normal erythrocyte survival time, and a lack of increased excretion of fecal and urinary urobilinogen. A normal excretion of fecal urobilinogen may be the only means of distinguishing constitutional hepatic dysfunction from a mild hemolytic process without demonstrable anemia.

Hepatic disease is ruled out by history, absence of hepatic enlargement, normal hepatic architecture on histologic examination when liver biopsy is performed, and normal liver function studies (other than the bilirubin excretion test), including sulfobromophthalein sodium excretion test.

The jaundice of gallbladder disease and other intra or extra hepatic biliary obstruction is associated with an increase in the direct reacting bilirubin in the serum, and with other characteristic features of disease of the biliary tract.

A condition of nonhemolytic hypobilirubinemia associated with lipochrome like pigment in the liver cells has been reported.<sup>11</sup> In addition to the pigment deposits noted, the bilirubinemia is characterized by a relatively high direct reacting fraction, and a mild elevation of the sulfobromophthalein sodium retention.

Accurate diagnosis of constitutional hepatic dysfunction or familial nonhemolytic icterus is essential. An erroneous diagnosis of liver or biliary tract disease might lead to unnecessary exploratory surgery, prolonged period of hospitalization, data limitations, or even dismissal from the service, whereas a diagnosis of hemolytic disease may be followed by unnecessary and useless splenectomy.

The prognosis is excellent and life expectancy is not affected. No specific treatment is indicated. Explanation to the patient of the benign nature of the condition is often sufficient to remove many of his functional complaints.

### CASE REPORT

A 28 year-old white Puerto Rican was admitted to this hospital on 26 February 1956. He stated that he felt well until about five days prior to admission when he noticed onset of headache and a general weakness of his legs. He experienced chills, sensations and a "feeling" about two days before admission. He thought this was a



become darker in color about two days before entry but noticed no change in color of his stools. On the day before admission he was told his skin was yellow. He had no nausea, vomiting or abdominal pain. He had received a routine influenza inoculation in November 1955.

**Post History.** The patient was told in 1953 that he was jaundiced. He stated that his skin never cleared up although he never felt as bad as he did on admission. He had been under the care of a psychiatrist as an outpatient at his present duty station for treatment of a chronic anxiety neurosis, and since April 1955 had been receiving reserpine daily. A fellow member of the patient's service company had been hospitalized shortly after the patient's admission with a subsequently substantiated diagnosis of infectious hepatitis. The patient had been a worker in a watch crystal factory prior to entering the Army in 1951. He served in Korea during 1951-1952 and had been in his present command for about one year. He denied alcoholic intake or exposure to possible hepatotoxins or hemolytic agents; he denied any history of jaundice or liver trouble among members of his family. He is the second of eight siblings, all of whom are living and well.

**Physical Examination.** The patient was a fairly well-developed and nourished white male who did not appear ill. He was alert but tense and apprehensive. His temperature was 99°F, blood pressure 110/60 mm Hg, pulse rate 80 per minute. There were no abnormal physical findings other than moderate icterus of the scleras and skin. There was no enlargement of any abdominal organ. There were no stigmata of chronic liver disease. Digital rectal examination revealed a small amount of brown stool.

**Laboratory Studies.** The leukocyte and differential counts were normal. Hemoglobin was 14.3 grams per 100 ml, hematocrit 43 ml per 100 ml, corrected sedimentation rate 20 mm in 1 hour. Routine urinalyses were negative for sugar and albumin and negative microscopically. The microflocculation test for syphilis was negative. Serum amylase, fasting blood sugar, blood urea nitrogen, and prothrombin time were all within normal limits. The heterophile antibody titer was 1:14. Coombs test negative, reticulocyte count 1.5 per cent of erythrocyte count. Erythrocyte fragility studies showed beginning hemolysis at 0.44 per cent NaCl, complete hemolysis at 0.30 per cent NaCl; control beginning hemolysis at 0.42 per cent NaCl, complete hemolysis at 0.32 per cent NaCl. Total serum proteins were 7.5 grams per 100 ml with an albumin-globulin ratio of 5:1.2.4. Initial serum bilirubin 5.25 mg per 100 ml with an indirect or delayed component of 5.02 mg per 100 ml. Serum cholesterol 236 mg per 100 ml with an esterified fraction of 72 per cent. Alkaline phosphatase 2.2 Bodansky units, rhmol turbidity 2.3 units, cephalin-cholesterol flocculation negative at 48 hours. There was 2.5 per cent retention of sulfobromophthalein sodium 45 minutes after intravenous injection of 5 mg per kilogram of body weight. Urinary urobilinogen was 1 Ehrlich unit in a 2-hour afternoon specimen. Fecal urobilinogen excretion was 105 mg per 24 hours. Tests for

urinary porphobilinogen and uroporphyrin were negative. A bilirubin excretion test revealed 85 per cent retention 4 hours after injection of 50 mg of bilirubin intravenously, as compared with a normal retention of less than 5 per cent. Serial liver function studies during the period of hospitalization were always normal except for an elevation of the serum bilirubin which varied between 1.6 and 3.15 mg per 100 ml, the increase always being in the indirect fraction.

Roentgenographic findings of the chest were within normal limits and a cholecystogram revealed a normally functioning gallbladder.

**Course in Hospital.** The patient remained afebrile throughout the period of hospitalization. He was treated as for hepatitis until it was known that the laboratory studies were typical of constitutional hepatic dysfunction or familial nonhemolytic jaundice. Thereafter, he received no specific treatment and was returned to full duty on 27 March. Unfortunately, circumstances prevented any investigation into the possible occurrence of this condition among other members of the patient's family.

On 13 April the patient was readmitted to this hospital in an acute exacerbation of his chronic anxiety state. All laboratory studies were again within normal limits except for a slightly elevated serum bilirubin of 1.4 mg per 100 ml, with an indirect fraction of 1.25 mg per 100 ml. It is interesting to note that the serum bilirubin value was only slightly above the normal at a time when the symptoms of the patient's anxiety state were most prominent.

### SUMMARY

Constitutional hepatic dysfunction is a benign and relatively asymptomatic disease. The only manifestation of the condition is intermittent or persistent jaundice, which may become evident at any age. It apparently is caused by an abnormally high threshold in the hepatic cells for the excretion of bilirubin formed at the usual rate.

The only abnormal physical finding is the jaundice. Hyperbilirubinemia, from an elevated indirect reacting bilirubin, is the only abnormal laboratory finding. On histologic examination the liver tissue appears normal.

No specific treatment is indicated and the prognosis is excellent. Accurate diagnosis of constitutional hepatic dysfunction is essential to prevent unnecessary exploratory surgery or splenectomy, prolonged hospitalization, duty limitations, or even discharge from the service.

### REFERENCES

1. Gilbert A, Lereboullet P, and Herscher M. Les trois choleemies congenitales. *Bull. et mem. Soc. med. d'hop. de Paris* 24: 1203, 1907. Cited in Hult, H. "Cholemie simple familiale (Gilbert) and posthepatic states without fibrosis of liver." *Acta med. Scandinav. (suppl. 244)* 138: 196, 1950.

2. Rozendaal H. M. Comfort M. W. and Soell A. M. Slight and late jaundice: significance of elevated concentrations of bilirubin giving indirect van den Bergh reaction. *J. A. M. A.* 104: 374-379 Feb. 2, 1935.
3. Comfort M. W. Constitutional hepatic dysfunction. *Proc. Staff Meet. Mayo Clin.* 10: 57-61 Jan. 1935.
4. Comfort M. W. Constitutional hepatic dysfunction. *M. Clin. North America* 29: 982-989 July 1945.
5. Comfort M. W. and Hayne R. M. Constitutional hepatic dysfunction: clinical study of 35 cases. *Gastroenterology* 3: 155-162 Sept. 1944.
6. Meulengracht E. Review of chronic intermittent juvenile jaundice. *Quart. J. Med.* 16: 83-98 Apr. 1947.
7. Dameshek W. and Singer K. Familial nonhemolytic jaundice: constitutional hepatic dysfunction with indirect van den Bergh reaction. *Arch. Int. Med.* 67: 259-285 Feb. 1941.
8. Johnson F. B. and Dubin L. N. Excessive lipochrome pigments in liver cells in constitutional hyperbilirubinemia. (abstract). *Am. J. Path.* 29: 585-586 May-June 1953.
9. Sprinz H. and Nelson R. S. Persistent nonhemolytic hyperbilirubinemia associated with lipochrome-like pigment in liver cells: report of 4 cases. *Ann. Int. Med.* 41: 952-962 Nov. 1954.

## HEPATIC COMA

"The relationship between ammonia intoxication and impending hepatic coma and even deep coma produced by protein and other nitrogenous substances such as ammonium chloride is by no means clear. It is true that some patients have a high venous blood level of ammonia when hepatic coma develops but the relation is not yet distinct nor constant enough to imply an etiological relationship. The empirical fact remains that in certain patients hepatic coma may be induced by protein whatever the biochemical defect may be."

—CHARLES S. DAVIDSON M.D.  
in *Journal of American Medical Association*, p. 391 Feb. 4, 1956

# Unique Renal Trauma

ANTHONY A BORSKI, Major MC USA

**T**HE traumatic severance of a renal artery which is presented here is unique in that no other major organs were involved and no ribs were fractured. Moreover, the kidney remained grossly intact during the trauma to its pedicle. Search of the literature failed to reveal a similar case. Previously reported cases of lacerated renal vessels had other organs involved and ended fatally. In the present case the severed renal artery was not diagnosed preoperatively.

## CASE REPORT

An 18 year old soldier was admitted to this hospital at 0900 hours on 1 February 1955 complaining of pain in the left flank and left side of his chest. The patient stated that he had jumped from a slow moving truck, slipped and fallen under the vehicle. His screams caused the driver to apply the brakes; however, the forward momentum of the truck pushed him several feet along the snow covered road as the rear wheels compressed the left side of his body. No treatment was received prior to admission to this hospital.

Physical examination revealed a well-developed and ambulatory patient. His blood pressure was 124/74 mm Hg, pulse 80, respiration 20, temperature 98.2°F. The thorax was symmetrical and well developed. There were several superficial abrasions over the left lateral thorax. The abdomen was soft and slightly tender in the left upper quadrant. There were no palpable masses. Peristalsis was normal. There was moderate tenderness and questionable bulging in the left flank. A few superficial abrasions were noted over the left flank. No other abnormalities were noted on physical examination.

A roentgenogram of the chest did not reveal evidence of any fractured ribs. The lungs were clear except for the left base where there were some signs of pneumonitis. There was no free air under the diaphragm.

A white blood cell count showed a total of 15,600 cells per  $\mu$ l with a differential count of 85 per cent neutrophils, 11 per cent lymphocytes and 4 per cent eosinophils. Red blood cell count was 4,500,000 per  $\mu$ l, hemoglobin 14 grams per 100 ml, and hematocrit 44 ml per 100 ml. Urine was normal.

---

From 121st Evacuation Hospital, Korea. Maj. Borski is now assigned to Fitzsimons Army Hospital, Denver, Colo.

The patient was admitted to the surgical service for observation for possible splenic injury. Approximately 10 hours following admission his blood pressure started to rise and 12 hours following admission it was 210/105 mm Hg and his pulse was 120. He had emesis and diaphoresis and the tenderness and bulging increased in the left flank. A urologist was consulted. His findings were essentially as already described but the flank mass was interpreted as due to renal injury and therefore an intravenous urogram was taken (fig 1). There was no apparent renal function on the left and the psoas outline was absent on the left. The bladder appeared normal on cystoscopy and clear urine



Figure 1 Intravenous urogram showing normal renal function on the right. Contrast media and renal outline are not visible on the left.

was spurting from the right ureteral orifice but there was no efflux from the left. A ureteral catheter was passed to the left renal pelvis but no urine was obtained. A left retrograde urogram revealed a normal left calyceal outline (fig 2).

We were therefore confronted with a patient who had a nonfunctioning left kidney with a normal calyceal outline. The kidney was de-

pressed and the psoas muscle outline was obliterated. There was marked bulging of the left flank which was interpreted as due to hemorrhage. Surgical intervention was undertaken using a transthoracic approach. When the diaphragm was incised a large collection of blood was noted. Approximately 1500 ml of blood was evacuated. The kidney appeared grossly normal and the capsule was intact but there was no pulsation at the pedicle. Examination of this region showed a 4 cm segment of a large vessel with a ragged end attached to the kidney. There was but one intact vessel to the kidney namely the vein. The surgeon confronted with a severed renal artery quickly clamped and



*Figure 2 Retrograde urogram showing a normal left calyceal outline. Residual contrast media from intravenous urogram faintly outlines the right kidney.*

divided the ureter and vein and removed the kidney. There was a very small segment of renal artery attached to the aorta which was clamped and ligated. The peritoneal cavity was explored and the spleen and intestines were found to be intact.

Blood pressure returned to normal levels on the third postoperative day. The postoperative course was uneventful except for a small co

lection of pleural fluid which was aspirated on the fourteenth post operative day. A roentgenogram of the chest taken one month after discharge from the hospital revealed normal findings and the patient was asymptomatic.

### DISCUSSION

This case presented several puzzling aspects. Initially splenic or renal injury was suspected. The presence of intact ribs, normal urinalysis, blood studies, and vital signs, and the absence of a definite mass in the left flank contributed to a later impression of contusion of the thorax and left flank. The benign symptoms and normal laboratory findings led the physician to omit obtaining on admission an abdominal roentgenogram of the kidneys, ureters, and bladder (KUB) and an intravenous urogram. Ten hours following admission the patient apparently had considerable hemorrhage as evidenced by the physical and operative findings.

Preoperatively we interpreted the hypertension as most likely due to adrenal damage and the depression of the kidney by the suprarenal mass (blood). The source of the blood was believed due to a laceration of the renal cortex without injury to the calyces or pelvis. The cause of the nonfunctioning kidney was known but reflex anuria secondary to renal trauma or obstruction of the renal vein or artery by an embolus were possibilities. Displacement of the kidney in such a manner as to cause compression of the pedicle would have produced an abnormal retrograde urogram. Aortography was not feasible because of the flank mass. The transthoracic approach was used for better exposure and also to fully evaluate the spleen and abdominal viscera. In retrospect it is believed that the proximal segment of the renal artery went into vasospasm immediately after the severance of the artery and it was only after a delay of about 10 hours that secondary hemorrhage occurred. It is amazing that the compressing force of the injury could selectively cause severance of the renal artery without rupture or distortion of the renal parenchyma.

### CONCLUSIONS

injury may sev	the renal artery without
s or producti	erations of the renal
considered	differential diagnosis
hemorrha	resent, (2) an intra
nfunctio	ev, and (3) a retro
al pelvi	cyces

# Homozygous Hemoglobin C Disease

## Relation to Military Service

ROBERT D GENS *Captain, USAF (MC)*

**S**INCE the demonstration by Pauling and associates<sup>1</sup> that normal human hemoglobin and sickle cell hemoglobin differ in electrophoretic mobility, it has been possible by the use of electrophoresis to identify a series of abnormal human hemoglobins. Research in this area was at first slow, because electrophoretic identification of abnormal hemoglobins was made with the cumbersome and costly Tiselius apparatus. Recently, however, the development of filter paper electrophoresis has permitted the rapid and inexpensive identification of a patient's hemoglobin type, with the result that in many laboratories, including our own, electrophoretic identification of a patient's hemoglobin type is a routine procedure when studying a patient for a suspected hereditary anemia.

The purpose of this article is to discuss the signs, symptoms, and laboratory findings of a patient with homozygous hemoglobin C disease and to relate these findings to the patient's service desirability.

### CASE REPORT

A 22 year old Negro airman was recently admitted to our hospital with a laceration of his right thigh. He denied any history of jaundice, fatigability, joint or bone pain, or leg ulcers, and there was no family history of these abnormalities.

Physical examination revealed a well nourished, well developed man with no evidence of pallor or jaundice. His fingers were of normal size, and there was no evidence of leg ulcers. The spleen was firm with a sharp edge that was palpable 12 cm below the left costal margin. The liver was not palpable. The remainder of the physical examination was noncontributory.

Laboratory studies showed that hemoglobin was 10.5 g/100 ml, hematocrit 29 ml/100 ml, erythrocyte count 3,540,000/ $\mu$ l, with 12 percent reticulocytes, direct antiglobulin test negative, sickle cell prepa-

---

From U S Air Force Hospital, Eglin Air Force Base, Fla.



ration negative total serum bilirubin 0.8 mg/100 ml. A peripheral blood smear showed marked anisocytosis and poikilocytosis with some polychromatophilia approximately one half of the erythrocytes were target cells and an occasional spherocyte was present. 2.2 per cent of the hemoglobin was alkali resistant (the upper limit of normal for our laboratory). Osmotic fragility<sup>2</sup> showed a marked increase in resistance of the erythrocytes to hypotonic saline solution. Roentgenograms of the skull and chest showed no abnormalities.

The filter paper electrophoretic pattern (using the method of Smith and Conley<sup>3</sup>) is shown in figure 1. All of the patient's hemoglobin is

	Hemoglobin type		
	C	S	A
Standard	C A		
Standard	C S		
Patient	C C		
Wf	A A		
Child	C A		
Cord blood	F A		

Figure 1. Paper electrophoresis. Hemoglobin C migrates the slowest and hemoglobin A (normal) the fastest with hemoglobin S (sickle cell) intermediate in speed of migration.

seen to reside in the C fraction while his wife is homozygous for hemoglobin A. Their child is of course heterozygous for hemoglobins C and A.

### DISCUSSION

Hemoglobin C was first described by Itano and Neel.<sup>4</sup> It is transmitted genetically as a simple Mendelian dominant and has been estimated to occur in about three per cent of the Negro race. The occurrence of homozygous hemoglobin C disease in the American Negro is approximately 1 in 6,000.<sup>4</sup> A combination of hemoglobin C and hemoglobin A is clinically benign and is manifested by an altered electrophoretic pattern and leptocytosis (target cells). Neither anemia nor splenomegaly have been reported in this heterozygous state.

The patient's splenomegaly, mild anemia, increased erythrocyte production and leptocytosis are typical of homozygous hemoglobin C disease, in which the life span of the endogenous erythrocytes is known to be markedly diminished.<sup>7-9</sup> Although bone and joint pain symptoms are occasionally described,<sup>9</sup> there are no reports of abdominal pain, hemolytic crises, or splenic infarction in patients with this disease. Characteristically, they experience little distress while pursuing sedentary occupations.

This patient's spherocytosis is in accord with previously noted findings in homozygous hemoglobin C disease.<sup>10</sup> We believe the spherocytosis may be related to his splenomegaly, perhaps indicating "hypersplenism."

At present the patient is associated with a food service squadron, but we believe that a more rigorous life might produce clinical symptoms of anemia. Furthermore, splenomegaly predisposes him to splenic rupture via mechanical trauma. This factor might indicate the need for splenectomy, although splenectomy would not, of course, ameliorate the genetically determined hemolytic process. Discharge from the service should be seriously considered.

The literature concerning splenic rupture and hypoxemia<sup>11,12</sup> is pertinent to this airman, and our experience with him in an altitude chamber will be reported elsewhere.

### SUMMARY

A case of homozygous hemoglobin C disease is reported, and the possible military disposition of the patient is discussed.

---

ACKNOWLEDGMENT I am indebted to Dr. Barkley Beidleman, 1750 N. Palafox St., Pensacola, Fla., for the electrophoretic study.

## REFERENCES

- 1 Pauling L, Itano H A, Singer S J and Wells I C. Sick cell anemia, molecular basis. *Science* 110 543-548 Nov 25 1949
- 2 Dacie J V. *The Hemolytic Anemias*. Grune & Stratton Inc. New York N Y 1954 pp 476-479
- 3 Smith E W and Cooley C L. Filter paper electrophoretic of human hemoglobin with special reference to sickle cell and clinical significance of hemoglobin C. *Bull. Johns Hopkins Hosp* 93 94-106 Aug 1953
- 4 Itano H A and Neel J V. New inherited abnormality of human hemoglobin. *Proc Natl Acad Sci* 36 613-617 Nov 1950
- 5 Schneider R G. Incidence of human globin C trait in 505 normal Negro families with homozygous human globin C and sickle cell trait unit. *J Lab & Clin Med* 44 133-144 July 1954
- 6 Terry D W, Mottley A G, and Rith C E. Homozygous hemoglobin C new hereditary hemolytic disease. *New England J Med* 251 365-373 Sept 2 1954
- 7 Spert T H, Alwy R H, and Ward G. Homozygous type C<sup>+</sup> hemoglobin. *Pediatrics* 12 483-490 Nov 1953
- 8 Singer K, Chapman A Z, Goldberg S R, Rabinowitz H M, and Rabinowitz S A. Sickle cell anemia hemoglobin S pure (homozygous) hemoglobin C disease. *Blood* 9 1023-1031 Nov 1954
- 9 Riey H M, Lurie D L, and McCormack G H Jr. Some clinical biochemical defects in hemoglobin C. *J Clin Invest* 32 1277-1284 Dec 1953
- 10 Singer K. Hereditary hemolytic disorders associated with abnormal hemoglobins. *Am J Med* 18 633-652 Apr 1955
- 11 Ritts R, Luttge S W, Fritzen W L, Stock A E, and Mottley A G. Splenic infarction in kidney during airplane flight in those with hemoglobin analysis. *Am J Med* 44 257-270 Feb 1956
- 12 Jerdan J P, Cline J C, Petersen W L, and Engel C E. Splenic infarction with hypoxia. *J Aviat Med* 6 29-34 Feb 1955

---

Human knowledge probably will always be incomplete. It increases through the years and we are encouraged by what is called progress. But in our eagerness to advance we must not look upon each forward step as having reached the ultimate goal. Nor should we, without proper reservations, be hurried into embracing immature ideas and practices."

—ROBERT L. LEVY, M.D.  
in *Journal of Chronic Diseases*  
p 338 Oct 1956

# Meconium Ileus

## With Cystic Pancreatic Fibrosis and Early Pulmonary Complications

MELVIN E JENKINS *Captain USAF (MC)*

EVAN W SCHEAR *Major USAF (MC)*

**F**OR FOUR months we have had under observation a female infant who has manifested cystic fibrosis of the pancreas since birth. A successful operation for complete intestinal obstruction due to meconium ileus was performed at 23 hours of age. Her subsequent development, at six weeks of age, of the most typical early respiratory complication of this disease, lobar atelectasis, prompted this report.

### CASE REPORT

A full term white female newborn infant was delivered uneventfully on 13 March 1956 although some difficulty had been anticipated because of a rapidly progressing polyhydramnios in the mother, a 39 year-old multipara. There was no family history of congenital anomalies. Two half siblings had shown no evidence of cystic fibrosis of the pancreas.

After delivery induced by Pitocin (brand of oxytocin) the infant became moderately cyanotic and somewhat lethargic. An occasional cry was weak and "cephalic like." The abdomen seemed large. Birth weight was six pounds two and one half ounces. The circumference of the head was 14 inches, of the chest 11¼ inches, and of the abdomen 14 inches. The head appeared unusually large for so small an infant; however, no bulging or even tenseness of the anterior fontanelle was noted. The lung fields were relatively clear to auscultation and no cardiac murmurs were elicited. The abdomen, despite being obviously distended, was soft and exhibited a peculiar doughy sensation on palpation. No neurologic findings were apparent excepting moderate muscular weakness.

A nasal catheter was passed to the stomach without difficulty and a thermometer was inserted rectally. Roentgenograms of the abdomen at two and three fourths hours of age revealed a small air bubble in the stomach with no gas shadows distal to the pylorus.

---

From 6110th U S Air Force Hospital APO 710 San Francisco Calif

The red blood cell count was 5 470 000/ $\mu$ l and hemoglobin was 17.9 g/100 ml

The infant was watched closely for the next 18 hours during which time no meconium was passed and the abdominal distention increased. However, there was no vomiting of mucus or detectable drooling. Her general condition remained only fair with mild cyanosis of the hands and feet and moderate weakness. Repeat roentgenograms at 19 hours of age (fig. 1) revealed a complete lower bowel obstruction, making immediate operation mandatory. Surgical exploration of the abdomen at 23 hours of age revealed meconium ileus. Viscid meconium was present throughout the small intestine from the mid jejunum to within one inch of the cecum, the colon appearing cordlike. Since the process seemed to involve so lengthy a segment of small bowel, resection was deemed impractical.



Figure 1 Roentgenogram of abdomen at 19 hours of age demonstrating dilated duodenum and jejunum. No large bowel shadows are seen.

Enough of the meconium to relieve obstruction was removed with considerable difficulty through six enterotomy incisions, and a concentrated suspension of pancreatin was instilled during closure of the jejunum and ileum. The infant tolerated the lengthy procedure well. During the first 52 postoperative hours, continuous gastric suction was applied, and she was maintained on whole blood plus parenteral fluids and vitamins. Prophylactic antibiotics consisted of

60 mg (100 000 units) of aqueous sodium penicillin G given every eight hours and 100 mg of streptomycin sulfate given intramuscularly every 12 hours

On the third postoperative day a thin plug of whitish gray meconium was passed rectally after which moderate amounts of dark meconium followed at the rate of four to five stools per day. Gastric suction was discontinued on the third postoperative day and small amounts of glucose in water by mouth begun within eight hours of the start of glucose feedings. 5 ml of a weak Olac formula was accepted and tolerated well. The formula was continued every two hours and increased to 15 ml per feeding within 24 hours. 0.3 gram of pancreatic extract twice daily was given in the formula.

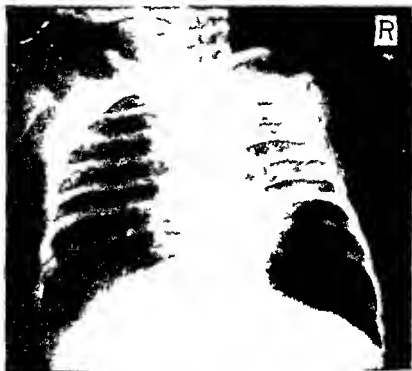
The infant's progress was steadily uphill after feedings were initiated. She quickly became much stronger and exhibited no adverse findings. She was discharged on the 15th postoperative day, to be followed weekly in view of the possibility of cystic fibrosis of the pancreas. For the first two weeks following her discharge from the hospital the patient seemed to progress well in weight gain, appetite and general appearance. A dry hacking cough with some wheezing developed at four weeks of age. At this time the infant was placed on a regimen of 50 mg of Terramycin (brand of oxytetracycline) every six hours and an expectorant cough mixture. Her formula was still being supplemented with vitamins and pancreatin. After improvement of the initial upper respiratory infection pancreatin was stopped and daily examination of stools for trypsin showed an absence of this enzyme.

At the age of six weeks the infant developed an episode of marked respiratory difficulty with what was described by the mother as a bluish discoloration of the skin. Physical examination at this time revealed an acutely ill infant who appeared in marked respiratory distress with obvious cyanosis and dehydration. There were crepitation and harsh rales throughout both lung fields with dullness to percussion over the right side of the chest. There was moderate subcostal retraction on inspiration. Roentgenograms revealed a pneumonic infiltration of the upper right lobe with evidence of segmental or lobar atelectasis (fig. 2). The infant was hospitalized and placed in an oxygen tent during the first week, taking nourishment poorly and requiring fluids intravenously. Antibiotic therapy consisted of 148.7 mg (150 000 units) of procaine penicillin G twice daily for 10 days and 100 mg of streptomycin sulfate every 12 hours for 12 days.

After the eighth hospital day gradual clinical improvement began. A follow up roentgenogram on the ninth hospital day revealed complete clearing of the pneumonic and atelectatic processes.

Follow up examination at four months of age revealed the infant to be progressing satisfactorily. She was on 50 mg of prophylactic

Terramycin twice daily. Her diet consisted of a full strength Olac formula, rice, cereal, bananas, strained meats, and a few strained fruits. She was taking multivitamin<sup>®</sup> in about four times the recommended daily dosage, and 0.2 gram of ferrous sulfate daily. Pancreatin was being continued (0.5 gram twice daily). At six months of age the patient was progressing fairly well in California, the family having returned to that state. However, pulmonary problems requiring medical care were evident.



*Figure 2. Roentgenogram of chest at six weeks of age revealing an opacity in the upper right lung field with narrowing of rib interspaces.*

#### DISCUSSION

The case presented above demonstrates the earliest manifestation of cystic fibrosis of the pancreas, meconium ileus. The symptoms of meconium ileus are essentially the same as those of any other form of obstruction of the lower small intestine in the newly born infant.

It is interesting that the obstetrician noted an unusually enlarged abdomen in the infant at birth. Initial roentgenograms of the abdomen at three hours of age revealed a gas pattern in the stomach only, interpreted by the radiologist as representing some form of intestinal obstruction.

Despite a 2½ hour abdominal operation at 27 hours of age entailing repeated manipulations of the small bowel and its mesentery, the infant's response postoperatively was satisfactory. In view of the observations that a few patients pass the obstructing meconium plug spontaneously after two or three days, one might delay operation in those patients with one or more siblings who have likewise had manifestations of cystic fibrosis of the pancreas. However, it must be kept in mind that the longer operation for intestinal obstruction in the newborn period is delayed, the more poorly these procedures are tolerated in general.

The episode of pneumonia and lobar atelectasis at six weeks of age is not unusual. In fact, lobar atelectasis with obstructive emphysema occurs in about 10 per cent of patients with cystic fibrosis of the pancreas.<sup>2</sup> It usually appears in early infancy during the first episode of pulmonary involvement and typically affects one or more lobes of the right lung. The condition is quite serious and may be rapidly fatal. Bronchoscopy and bronchial aspiration through a tracheotomy tube are usually ineffective.<sup>2</sup> Successful treatment of lobar atelectasis in this disease depends upon the intensive use of antibiotics and adequate nursing care.

An early fatal termination is not inevitable in cystic fibrosis of the pancreas if adequate therapy, including a dietary regimen, is given, although the prognosis is still poor for those patients who develop respiratory infections in the first two or three months of life. A high caloric diet is recommended in view of the associated poor nutrition. Proteins are well tolerated, although poorly utilized. A high protein diet—10 to 12 grams per kilogram of body weight—is usually recommended for young infants. Fats should be given sparingly with the essential fatty acids being supplied by egg yolk or peanut butter. The carbohydrate intake should be high chiefly to furnish needed calories. Vitamins A and D as supplements are required in about four times the usual dosages. Pancreatin is probably not needed after adequate nutritional progress has been established.

As a rule, prophylactic chemotherapeutics and/or antibiotics decrease the frequency and severity of respiratory infections. The administration of Gantrisin (brand of sulfisoxazole) in one fourth to one half the therapeutic dose will usually prevent the occurrence or progress of pulmonary infections. Terramycin or aureomycin (chlortetracycline hydrochloride) may likewise be used prophylactically.



## SUMMARY

A case of an infant with cystic fibrosis of the pancreas with meconium ileus at birth has been presented. A successful operation at 23 hours of age was followed by a relatively mild post-operative course. The patient's sudden development of pneumonia with lobar atelectasis at six weeks of age responded well to antibiotic therapy.

The dietary and antibiotic management of this disease is briefly discussed.

## REFERENCES

- 1 Anderson D H Cystic fibrosis of pancreas In McQuarrie I (editor): *Brenner's Practice of Pediatrics* W F Prior Co Hagerstown Md 1954 Vol 1 chap 29-4, pp 1-20
- 2 de Sant Agnes P A Bronchial obstruction with lobar atelectasis and emphysema in cystic fibrosis of pancreas *Pediatrics* 12: 178-190 Aug 1953

## PREVENTION OF RECURRENCE OF PSORIASIS

An important tenet in the treatment of psoriasis which will help minimize the frequency of recurrences is to overtreat the involved areas. Continued topical treatment for four to six weeks after the apparent resolution of lesions will often prevent a recurrence in these locations. The frequency of recurrences at identical sites of former lesions combined with recent work by the French school of dermatology showing that psoriatic lesions are often present after apparent clinical healing has taken place implies that the clinical disappearance of the lesions is an inadequate guide for the discontinuance of therapy.

—LAWRENCE FRANK M D  
in *American Practitioner and Digest of Treatment* p 874 Nov 1954

# Rupture of the Esophagus by Compressed Carbon Dioxide

R MAURICE HOOD *Commander MC USA*

**T**RAUMATIC perforation of the esophagus may be produced by numerous types of external agents. Most frequently, endoscopic procedures and ingested foreign bodies are direct etiologic mechanisms. Penetrating and blast injuries are relatively infrequent even in wartime.

A case of rupture of the cervical esophagus by compressed carbon dioxide is reported here. A review of the literature revealed only three previously reported ruptures caused in a similar manner. In 1909, Petren<sup>1</sup> reported a case of rupture of the midesophagus in a 27 year old man who accidentally discharged a compressed air hose into his mouth. The man died 27 hours after injury. Kerr, Sloan, and O'Brien<sup>2</sup> reported the case of a 3 year old child who bit an inflated manor tube, producing a blow out of the tube into his mouth. Rupture of the thoracic esophagus just above the diaphragm resulted in a left tension pneumothorax with extensive mediastinal and subcutaneous emphysema. The child recovered following drainage of the pleural space and gastrostomy. Borghero<sup>3</sup> reported a case of rupture of the thoracic esophagus by compressed methane gas discharged accidentally into the patient's mouth. Similarly caused injuries involving the rectum and sigmoid colon are well known, and it is surprising that esophageal injuries of this type are not more common.

The esophagus is a thin walled, hollow viscus having no serosal covering. It is susceptible to perforation by rather minimal degrees of trauma. Kinsella, Morse, and Hertzog,<sup>4</sup> in an experimental study using fresh human cadavers, showed that rupture of the esophagus occurred at intraluminal pressures of 1.9 to 6.3 pounds per square inch. From their study it was also shown that the area of the esophagus just above the diaphragm was prone to rupture most easily. However, many other factors such as the level of intrapleural pressure, linear tension of the esophagus, rapidity of distention, and age of the patient would render the intraluminal pressure of rupture a variable and not a constant factor.

---

From U S Naval Hospital Oakland Calif

## SUMMARY

A case of an infant with cystic fibrosis of the pancreas with meconium ileus at birth has been presented. A successful operation at 23 hours of age was followed by a relatively mild post-operative course. The patient's sudden development of pneumonic infiltration with lobar atelectasis at six weeks of age responded well to antibiotic therapy.

The dietary and antibiotic management of this disease is briefly discussed.

## REFERENCES

1. Anderson O H. Cystic fibrosis of pancreas. In McQuarrie J (editor) *Bernheim's Practice of Pediatrics*. W F Prior Co. Hagerstown Md. 1954. Vol 1. ch p 29-A. pp 1-20.
2. de St Agese P A. Bronchial obstruction with lobar atelectasis and emphysema in cystic fibrosis. *Pediatrics* 12: 178-190. Aug. 1953.

## PREVENTION OF RECURRENCE OF PSORIASIS

An important tenet in the treatment of psoriasis which will help minimize the frequency of recurrences is to overtreat the involved areas. Continued topical treatment for four to six weeks after the apparent resolution of lesions will often prevent a recurrence in these locations. The frequency of recurrences at identical sites of former lesions combined with recent work by the French school of dermatology showing that psoriatic lesions are often present after apparent clinical healing has taken place implies that the clinical disappearance of the lesions is an inadequate guide for the discontinuance of therapy.

—LAWRENCE FRANK M D  
in *American Practitioner and Digest of Treatment* p 874. Nov. 1954.



Figure 1 Roentgenogram made following a swallow of lipidol which demonstrates interstitial emphysema, extracastation of the mediastinum outside of the esophagus, and slight deviation of the trachea toward the right.

performed. Following this an oral surgeon reduced the open fracture of the nasal bone, left maxilla and floor of the left orbit.

The patient's postoperative course was surprisingly smooth. Tracheostomy was abandoned on the fifth postoperative day. Feeding by gastrostomy was discontinued on the eighth day and oral feedings were resumed on the fifteenth. The salivary fistula closed spontaneously after 10 days. The drains were removed on the twelfth day. There was never any systemic or local evidence of infection. The patient was transferred to the eye ear nose and throat service for further reconstructive surgery of the eye and facial bone. Five months after injury there was no evidence of stricture of the esophagus.

#### SUMMARY AND CONCLUSION

Injuries of the esophagus are frequently and easily overlooked in the early phase and particularly so when the attention of the physician is drawn to other severe chest or neck injuries. A patient with rupture of the cervical esophagus by carbon dioxide from a fire extinguisher, the associated cutaneous emphysema and a chest wound within five hours of injury is a possible

## CASE REPORT

The patient a 22 year old man was engaged in loading carbon dioxide fire extinguishers into a truck when he accidentally depressed the release handle. The nozzle recoil caused the hose and nozzle to swing around violently striking the man in the face. The full force of the expanding gas was directed at his nose and mouth. The pressure produced can only be guessed at (The cylinder pressure in these extinguishers is normally from 700 to 800 pounds per square inch at 70 F). He was dazed but not rendered unconscious. When seen by the medical officer 10 minutes after injury he was bleeding profusely from the nose and mouth. The patient was given 15 mg of morphine sulfate, a nasal pack was inserted and he was transferred to the hospital.

When examined in the emergency ward the patient was found to have an open comminuted fracture of the nose with an extensive soft tissue bruise and laceration over the left maxillary area. He was admitted to the eye ear nose and throat service. Four hours after admission he began to complain of substernal pain radiating through to the back. An intern noted subcutaneous emphysema of the soft tissues of the neck more marked on the left and extending over the anterior chest wall. Consultation from the thoracic surgery department was requested and examination of the patient at that time revealed no evidence of pneumothorax. The subcutaneous emphysema although present was not extensive and was not progressing rapidly.

A roentgenogram of the chest showed mediastinal and cervical emphysema but no pneumothorax. After the patient swallowed lipiodol a roentgenogram of the cervical and thoracic esophagus showed extensive extravasation of the medium into the tissues of the neck at the level of the lower border of the thyroid cartilage (fig 1).

The patient was taken to the operating room immediately and under general anesthesia the pharynx and upper esophagus were examined. A laceration beginning at the level of the upper margin of the epiglottis was seen extending down the posterolateral wall of the pharynx and to a point 5 cm below the cricopharyngeus muscle. An endotracheal tube was inserted and the skin prepared and draped. A 3 inch incision was made along the anterior border of the left sternomastoid muscle. The left inferior thyroid artery was ligated and divided and the thyroid gland and trachea were retracted to the right. Extensive emphysema, tissue discoloration and copious amounts of thin exudate having a faintly foul odor were encountered. The esophagus and lower pharynx were exposed and the previously described laceration visualized. At the lower end of the rear a 2 by 2 by 0.5 cm piece of bone was re-covered. This evidently was from the facial area and had been swallowed. Because of extensive edema and necrosis of the tissues involved in the laceration no primary suture was attempted. Three Penrose drains were placed in the area of the laceration and the wound was packed open. Tracheostomy and gastrostomy were immediately

## A MESSAGE FROM THE A M A

This is the second part of a report on the results of a continuing opinion survey of physicians released from active military service. The first part of this report appeared in last month's issue of the *U S Armed Forces Medical Journal*. This summary is based on 2,191 returns received in 1955 of a total of 3,651 questionnaires that were mailed out by the Council on National Defense of the American Medical Association.

**Evaluation of Military Medical Training** The great majority of physicians filling out the questionnaire believed that all important features of medical military training had been satisfactorily covered. For the Air Force, 85 per cent were satisfied with the training, while 15 per cent were not satisfied, in the Army, 78 per cent were satisfied, and 22 per cent were not satisfied, in the Navy, 70 per cent were satisfied and 30 per cent were not. The basic orientation and indoctrination courses on military customs, administration, and regulations were most frequently listed as subjects in which too little training had been given.

**Physicians' Evaluation of Assignment** A large majority of the physicians (approximately 75 per cent of the three services) indicated that they were properly assigned. Also, the number of physicians who were satisfied with their assignments was greater than the number not satisfied (although the majority was less decisive in this second case). In the Air Force 80 per cent indicated they were properly assigned, while in the Army it was 76 per cent, and in the Navy 69 per cent. Less than 1 per cent in the three services failed to answer this question. As to being satisfied with the assignment, again, the Air Force had the highest response of 71 per cent, followed by the Army with 69 per cent and the Navy with 67 per cent.

**Physicians' Evaluation of Staffing Conditions** One of the questions requested an opinion as to staffing conditions of nurses, enlisted medical personnel, physicians, dentists, and others at those units where the physicians had served. The tabulation of this multiple answer question indicates that, in the Army, replies of overstaffing totaled 660, understaffing 985, and adequate staff

necrosis, edema and infection made direct repair impossible. Adequate drainage of the area through a cervical incision, tracheostomy and gastrostomy resulted in control of infection and closure of the salivary fistula within 10 days without permanent disability.

#### REFERENCES

- 1 Perren G. Ein Fall von traumatischer Oesophagusruptur. *Beitr z klin. Chir* 61: 265-284, 1909.
- 2 Keet H H, Slo H and Olsen C. E. Rupture of oesophagus by cigarette. *Am J Surg* 33: 417-420, Mar 1953.
- 3 Borghero A. Un caso di rottura dell'esofago da penetrazione accidentale di gas compresso (metano). *Riv internat mal prof* 40: 860-866, July-Aug 1953.
- 4 Finella T J, Moore R W and Hertig A J. Spontaneous rupture of esophagus. *J Thoracic Surg* 17: 613-631, Oct 1948.

#### CURIOSITY

Curiosity is one of the most important attributes of the mind and is indispensable in any educational process. One sees it at work in the animal kingdom: in the fledgling bird's first attempt at flight from the nest; in a kitten's tentative exploration of an unknown object; in the inquisitive sniffing of a dog at almost any vertical object. Young children have this divine gift of curiosity to a marked degree. It is a tragedy that all too often it is discouraged by stupid pedagogy. Fortunately curiosity is so much a part of living and learning that it is never wholly lost and with proper education can be made to grow again and thrive.

—JOHN H GIBBON, Jr. M.D.  
in *Annals of Surgery*  
p. 322, Sept. 1955

group in each service believed that all domestic duties could have been performed by civilian medical personnel

**Physicians Who Would Voluntarily Remain In Service** In response to the question relative to military service beyond the obligated tour of duty, 923 physicians indicated they would not be willing to stay in military service for more than their two years of service under any circumstances. A total of 1,203 physicians indicated they would serve an additional period under certain conditions. As expected, total war led the list of "certain conditions" for all three services, followed by "increase in pay." Other conditions on this list were choice of stable location or duty assignment, opportunity to practice specialty, and promotion to higher rank.

#### REFERENCE

1 Message from the A M A U S Armed Forces M J 6 1691 1692 Nov 1955

## Aero Medical Association Meeting

The Twenty Eighth Annual Aero Medical Association Meeting will be held in Denver Colo 6 7 and 8 May 1957 at the Shirley Savoy Hotel. Doctor Jan H Tillisch Rochester Minn President of the Association will open the sessions at 9 00 a m on the first day, after which Doctor Alberto Hurtado will deliver the Louis H Bauer lecture. Of considerable interest is the outstanding scientific program to be presented as multiple symposiums on the various disciplines allied to aviation medicine.

Among the prominent speakers scheduled are Colonel John P Strapp USAF (MC) Captain Norman L Barr MC USN Doctor Ross A McFarland of Harvard School of Public Health and such noted leaders in the field of civilian aviation medicine as Doctor L G Lederer Washington D C and Doctor C I Barron of Burbank Calif.

Colonel Paul A Campbell USAF (MC) will conduct the symposium on space travel in which such celebrated workers as Doctor Hubertus Strughold Doctor Vernher von Braun and Doctor Heinz Haber will participate.

The Association's annual banquet will be held on the evening of 8 May when the Lysrer Longacre and Tuttle Awards will be made. Colonel Levi M Browning Surgeon of the U S Air Force Academy is the general chairman of the 1957 meeting.



ing 2 005 In the Navy overstaffing totaled 400 understaffing 429 and inadequate staffing 1 146 The Air Force tabulation revealed 459 replies of overstaffing 892 of understaffing and 1 324 of adequate staffing By groups, physician overstaffing led the list in all three services followed by dentists and then enlisted medical personnel in the Army and Air Force while in the Navy it was enlisted medical personnel with dentist in third place The largest understaffed group in the Army and Air Force was nurses In the Navy dentists led nurses by a small per cent in understaffing It is interesting to note that these results are almost identical with the report covering the last six months of 1954 <sup>1</sup>

**Types of Patients Treated** One of the questions concerned the percentage of time devoted by physicians to military personnel dependents of military personnel and administrative duties both at domestic and overseas stations Approximately 50 per cent of the reporting physicians said that they devoted one half or more of their time to military personnel both at domestic and overseas stations One half or more of the time allotted to dependents of military personnel at domestic stations was indicated by 36 per cent of the replying physicians and at overseas stations by 93 per cent

**Types of Nonmilitary Medical Care** The type of medical care most frequently performed by medical officers for nonmilitary persons was outpatient care Second in order of frequency for all three services was general medical and hospital care (although in the Navy "other specialty services" tied for second place) For the Army "other specialty services" was third in order with obstetrics and gynecology the third in order for the Navy and Air Force

**Medical Duties Performed by Others** One of the questions was designed to obtain information with respect to provision of medical care for dependents by other than military physicians The question was worded differently in the questionnaire form for the last six months of the period reported, consequently separate tabulations had to be made for each half of the period In the first six month reporting period over 50 per cent of the replying physicians believed that their duties could have been performed by other personnel Of this group over two thirds in each of the three services indicated possible transfer of their duties to civilian medical personnel In the second six month period there was a spread of 12 to 50 per cent between services in which the physicians indicated that none of their duties could have been performed by civilian medical personnel The great majority replied that some most or all of their duties could have been performed by someone else About 40 per cent of this latter

group in each service believed that all domestic duties could have been performed by civilian medical personnel

**Physicians Who Would Voluntarily Remain in Service** In response to the question relative to military service beyond the obligated tour of duty, 923 physicians indicated they would not be willing to stay in military service for more than their two years of service under any circumstances. A total of 1,203 physicians indicated they would serve an additional period under certain conditions. As expected, total war led the list of "certain conditions" for all three services, followed by "increase in pay." Other conditions on this list were choice of stable location or duty assignment, opportunity to practice specialty, and promotion to higher rank.

#### REFERENCE

1 Message from the A M A U S Armed Forces M J 6 1691 1692 Nov 1955

---

## Aero Medical Association Meeting

The Twenty Eighth Annual Aero Medical Association Meeting will be held in Denver Colo 6 7 and 8 May 1957 at the Shirley Savoy Hotel. Doctor Jan H Tillisch Rochester Minn, President of the Association will open the sessions at 9 00 a m on the first day, after which Doctor Alberto Hurtado will deliver the Louis H Bauer lecture. Of considerable interest is the outstanding scientific program to be presented as multiple symposiums on the various disciplines allied to aviation medicine.

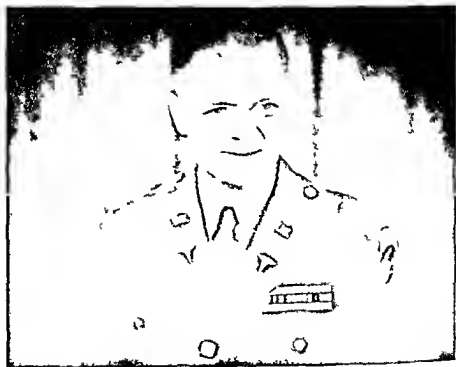
Among the prominent speakers scheduled are Colonel John P Stapp USAF (MC) Captain Norman L Barr MC USN Doctor Ross A McFarland of Harvard School of Public Health and such noted leaders in the field of civilian aviation medicine as Doctor L G Lederer Washington D C and Doctor C I Barron of Burbank Calif.

Colonel Paul A Campbell USAF (MC) will conduct the symposium on space travel in which such celebrated workers as Doctor Hubertus Strughold Doctor Wernher von Braun and Doctor Heinz Haber will participate.

The Association's annual banquet will be held on the evening of 8 May when the Lyster Longacre and Tuttle Awards will be made. Colonel Levi M Browning Surgeon of the U S Air Force Academy is the general chairman of the 1957 meeting.

## NEW COMMANDING OFFICER AT LANDSTUHL ARMY MEDICAL CENTER

Brigadier General Clement F. St. John MC USA has assumed command of the Landstuhl Army Medical Center U S Army in Europe succeeding Colonel Paul Hayes MC USA who has returned to the United States. This marks the first time the Medical Center has had a Brigadier General in command. In addition to the organizations at Landstuhl General St. John's new command includes the Army hospitals at Neubruecke, Bad Cannstatt, and Frankfurt, Germany, and five ambulance trains. General St. John was Deputy Surgeon U S Army in Europe from June 1955 until he assumed his present command.



General St. John has a long and illustrious military career in various staff and command assignments. He served in North Africa in 1942 with General Patton's Western Task Force, participated in the amphibious invasion at Casablanca, and took part in the Fifth Army's invasion of Salerno in September 1943. He was awarded the Legion of Merit, Medal for Valor (Italy), and Commander of Royal Order of the Crown (Italy).

# OFFICERS CERTIFIED BY SPECIALTY BOARDS

## Supplementary Listing

According to information from the Offices of the Surgeons General of the military medical services, the following regular Medical Corps officers have been certified by the boards indicated since the listings published in previous issues of this *Journal*

### American Board of Pediatrics

Fred B Becker Comdr USN	Fraancies Marshall Comdr USN
John E Buess Maj USA	Edward J Tomsovic Maj USA
Robert B Giffen Jr Lt Col USA	Allen S Weed Maj USAF
Thomas M Holcomb Maj USAF	

### American Board of Psychiatry and Neurology

#### Psychiatry

Theodore M Badgley Maj USA	Laurence C McGonagle Maj USA
Stuart L Baker Jr Lt Col USA	John M Murphy Capt USN
Arnold W Johnson Jr Maj USA	William J Tiffany Jr Lt Col USA
Robert R Heim Jr Maj USA	Werner K R Welz Lt Comdr USN
Mortimer V Kleinman Jr Maj USA	Paul G Yessler Lt Col USA

#### Neurology

Warren E Porter Maj USA

### American Board of Orthopaedic Surgery

George H Chambers Lt Col USAF	Robert W Parvix Lt Col USA
Coursen B Conklin Lt Col USA	John W Payne Maj USAF
James H Dobyns Maj USAF	Adolphe J Schoepflin Lt Col USA
John A Hennessen Jr Maj USAF	James K Tillotson Lt Col USA
Robert S Lockwood Lt Col USA	

### American Board of Dermatology and Syphilology

Henry L Hines Capt USA	Robert Levine Maj USA
------------------------	-----------------------

### American Board of Radiology

Claude D Baker Maj USAF	Gerald M McDonnell Lt Col USA
Nelson R Blemly Maj USA	John L Messersmith Capt USN
Edward T Byrne Capt USN	Warren A Nafis Maj USAF
Harry A Claypool Capt USA	Marshall W Olson Lt USN
Neil E Crow Capt USAF	Charles L Randolph Jr Capt USAF
Russell E Graf Lt Col USA	Leonard H Seitzman Lt Col USA
Walter F Hansen Comdr USN	Nicholas W Van Leeuwen Capt USA
Henry J Krawczyk Lt Col USA	Charles C Watts Jr Maj USAF
Philip J W Lee Capt USA	Norman L Yood Capt USN

## American Board of Urology

Ferris E Co k Jr Maj USAF  
Nichols M Hils Col USA

William E Morris C mdr USN

## American Board of Obstetrics and Gynecology

Paul S Andreson Jr Col USA  
Richard B Austin III Lt Col USA  
Byron L Hawks Capt USN

Fred A Heimstra Col USAF  
Albert B Loricz Lt Col USA  
Merill W Rush r Comdr USN

## American Board of Internal Medicine

Kenneth P B chman Comdr USN  
Glenn D Baird Maj USAF  
Kevin G Barry M J USA  
William R Beis l Maj USA  
James E Cas dy C pt USAF  
John S Cowa Capt USN  
Richard H Fe guso Maj USAF  
William H H ll Maj USA  
James H Hammond Col USAF  
James E H ae M J USA  
Donald M H sk n M J USAF  
Joseph H wk ns Maj USA  
Nestor M He sler Maj USAF  
Jack T Jo es Comdr USN  
Robert C J ne Maj USA

Wilbur L K noy r Maj USAF  
Stephen R Mills Jr Lt Comdr USN  
Stanley N wman M J USA  
Nicholas G Pottr gle s M J USA  
John H R ch rt M J USA  
Thomas L Robb s Lt Col USA  
John E Roberts Lt Col USA  
Milton F Rubi s M J USA  
Norman M Scott Jr Lt Col USA  
Vigil E Scib rt Comdr USN  
Vernon M Sm th Maj USA  
Robert J Sol mon Capt USAF  
Frederic G So le Jr C pt USN  
Robert B Stoneh ll Maj USAF

## American Board of Pathology

Robert M Dmm rre Comdr USN  
Edward J Fadell Lt Col USA  
Robert C H t dt Lt Comdr USN  
Joseph F H tzge Maj USA

Rbert Kelle berger Col USA  
Donald J McPherson Lt Comdr USN  
Rbert W Morris ey M J USAF  
Donald J Wi slow Lt Col USA

## American Board of Ophthalmology

Ell M Alt f th r Col USA  
Or n W Che ault C pt USN  
Shirley A Fuhring Capt USN

John N McN ir Lt Col USA  
Irving Wilk M J USA

## American Board of Otolaryngology

James L Sheehy M J USA

## American Board of Surgery

William W B ad man M J USA  
Joseph Castag o Lt Col USA  
Philip D Co eme ll r C mdr USN  
Do ald L Cu t C mdr USN  
Do ald W Edw d Lt C mdr USN  
David D Gree e Capt USN  
Harry J G m n Lt Col USA  
Harold F H m r Lt Col USA  
Al n R Hopema Maj USA  
Edward J J h ke Jr M J USA  
Rob B J m s J C pr USN  
Jack B J y M J USAF  
Will m G Kr ch Comdr USN  
Ir i g R Lym Col USA  
Geog W Marti Lt Col USA

Rosco E M n n M J USA  
Willis M H Mo cri f Jr Lt Col USA  
Al in S N ta s n Capt USAF  
Kewy G N l n C pr USA  
Th d r H Ni bl l M J USA  
John C Patre aon Lt Col USA  
Patrick P k s C pt USN  
Lindsay R Riddle Capt USN  
G rg F Rum r Lt Col USA  
Low ll R Sr l Lt Col USA  
Edgar E Thom s Lt Comd USN  
J s ph J T mms C pt USN  
Stephe H T li s C pr USN  
D n F W n J Maj USA

### American Board of Anesthesiology

Timothy G. Barila Maj USA  
Philip C. Canney Maj USA

Judah L. Heller Capt USAF

### American Board of Plastic Surgery

John A. Quinlivan Capt USAF

### American Board of Neurological Surgery

John B. Moyar Maj USA

### American Board of Physical Medicine and Rehabilitation

Robert J. Gosling Maj USA  
Arthur E. Grant Maj USA  
James A. Shaler Maj USA

Elias M. Throne Maj USA  
Frederick Vultee Jr Maj USA

### American Board of Preventive Medicine Public Health

John R. Hall Jr Col USA  
Max B. McQueen Col USAF  
Jack W. Millar Comdr USN  
Cecil S. Mollahan Col USA

Hugh W. Randel Maj USAF  
Howard K. Sessions Capt USN  
Stefano Vivona Maj USA

### Aviation Medicine

Louis B. Arnoldi Col USAF  
Murray W. Ballenger Capt USN  
Ferdinand Barnum Maj USAF  
Lynn S. Beals Jr Capt USN  
Bruce H. Bennett Col USAF  
Jack Bollerud Col USAF  
Franklin L. Bowling Maj USAF  
John E. Boyesen Col USAF  
Thomas A. Collins Lt Col USAF  
John R. Copenhaver Brig Gen USAF  
Thomas H. Crouch Col USAF  
James M. Davis Lt Col USAF  
Paul V. Davis Col USAF  
William K. Douglas Maj USAF  
James G. Espey Jr Col USAF  
George K. Fair Col USAF  
Donald L. Ferris Col USAF  
F. Whitney Haff Col USAF  
Henry C. Hunley Jr Capt USN  
Aubrey L. Jennings Col USAF  
Andres I. Karstens Col USAF  
William T. Keffley Lt Col USAF  
Wilbur E. Keffum Capt USN  
Paul H. Lance Col USAF  
Harold E. List Capt USN

Stanley Lutz Jr Maj USAF  
Charles B. Marshall Jr Maj USAF  
Earl Maxwell Brig Gen USAF  
Charles K. Morris Col USAF  
Harold A. Myers Col USAF  
Sam E. Neely Maj USAF  
Herman S. Parish Jr Maj USAF  
Philip B. Phillips Capt USN  
Clifford P. Phoebus Capt USN  
Joseph M. Quashnock Maj USAF  
Burt Rowen Lt Col USAF  
Hartwin A. Schulze Col USAF  
Vance E. Senter Capt USN  
Samuel D. Smelsey Lt Col USAF  
John T. Smith Capt USN  
Larry A. Smith Col USAF  
William M. Snowden Capt USN  
Ralph E. Switzer Col USAF  
Charles H. Talbot Lt Col USAF  
William R. Turner Maj USAF  
Eugene E. Van Vranken Maj USAF  
Frank B. Voris Capt USN  
Henry C. Wallace Col USAF  
Stanley C. White Maj USAF  
Hayden Withers Col USAF

### Founders Group in Occupational Medicine

Allan S. Chrisman Capt USN  
Gilbert H. Collings Maj USA  
Edward J. Dehne Lt Col USA  
John R. Hall Jr Col USA

Bartholomew W. Hogan Rear Adm USN  
Moffitt K. Hoffer Capt USN  
Lloyd B. Shone Capt  
Walter Wetnam Capt

## American Board of Urology

Ferris E Cook Jr Maj USAF  
Nicholas Mallis Col USA

William E Morris Comdr USN

## American Board of Obstetrics and Gynecology

Paul S Andreson Jr Col USA  
Richard B Austin III Lt Col USA  
Byron L Hawke Capt USN

Fred A Heimstra Col USAF  
Albert B Loric Lt Col USA  
Marshall W Rusher Comdr USN

## American Board of Internal Medicine

Kenneth P Bachman Comdr USN  
Glenn D Baird Maj USAF  
Kevin G Barry Maj USA  
William R Beisel Maj USA  
James E Cassidy Capt USAF  
John S Cowan Capt USN  
Richard H Ferguson, Maj USAF  
William H Hill Maj USA  
James H Hammond Col USAF  
James E Hanna Maj USA  
Donald M Hinkins Maj USAF  
Joseph Hinkins Maj USA  
Norton M. Hester Maj USAF  
Jack T Joos Comdr USN  
Robert C. Joos Maj USA

Wilbur L Kroyer Maj USAF  
Stephen R Miller Jr Lt Comdr USN  
Stanley Newman Maj USA  
Nicholas G Pottinger Maj USA  
John H Richter Maj USA  
Thomas L Robbins Lt Col USA  
John E Roberts Lt Col USA  
Milton F Rubin Maj USA  
Norman M Scott Jr Lt Col USA  
Virginia S. S. S. Comdr USN  
Vernon M Smith Maj USA  
Robert J. S. S. Capt USAF  
Francis G Soule Jr Capt USN  
Robert B. St. John Maj USAF

## American Board of Pathology

Robert M. D. M. M. Comdr USN  
Edward J. Fadell Lt Col USA  
Robert C. H. S. S. Lt Comdr USN  
Joseph F. H. S. S. Maj USA

Robert Kelleher Col USA  
Donald J. McPherson Lt Comdr USN  
Robert W. Morrissey Maj USAF  
Donald J. Wilson Lt Col USA

## American Board of Ophthalmology

Ellis M. Altshuler Col USA  
Oran W. Chevalier Capt USN  
Shirley A. Fuhring Capt USN

John N. McNair Lt Col USA  
Irving Wilkerson Maj USA

## American Board of Otolaryngology

James L. Sherry Maj USA

## American Board of Surgery

William W. Bandman Maj USA  
Joseph C. Stagno Lt Col USA  
Philip D. Crockett Jr Comdr USN  
Donald L. C. C. Comdr USN  
Donald W. Edwards Lt Comdr USN  
David D. Greene Capt USN  
Harry J. G. M. Lt Col USA  
H. L. F. H. M. Lt Col USA  
Alvin R. Hopeman Maj USA  
Edward J. J. H. S. S. Maj USA  
Robert B. J. M. S. S. Lt Capt USN  
Jacob B. J. M. S. USAF  
William G. Krach Comdr USN  
Irving R. Lyman Col USA  
George W. Mart Lt Col USA

Roscoe E. M. M. S. USA  
William H. M. C. S. S. Lt Col USA  
Alvin S. N. S. S. Capt USAF  
Kewyn G. N. S. S. S. Capt USA  
Theodore H. N. S. S. S. Maj USA  
John C. P. S. S. S. Lt Col USA  
Paul K. P. S. S. S. Capt USN  
Lloyd Y. R. S. S. S. Capt USN  
George F. R. S. S. S. Lt Col USA  
Lowell R. Steel Lt Col USA  
Edgar E. Thom Lt Comdr USN  
Joseph J. T. S. S. S. Capt USN  
Stephen H. Tolson Capt USN  
Donald F. W. S. S. S. Maj USA

## NATIONAL INDUSTRIAL HEALTH CONFERENCE

The Twelfth National Industrial Health Conference will be held at Kiel Auditorium St. Louis Mo. 20-26 April 1957. These Conferences annually bring together the five organizations whose members are responsible for maintaining the health of the nation's industrial workers: the Industrial Medical Association, the American Industrial Hygiene Association, the American Association of Industrial Nurses, the American Conference of Governmental Industrial Hygienists, and the American Association of Industrial Dentists.

Some 200 of the country's leading specialists and experts in the complexities and technicalities of preventive medicine and hygiene in industry will present the latest findings and developments relating to occupational diseases and injuries, nonoccupational conditions in employment, mental health, psychologic testing, rehabilitation, and physical therapy, geriatrics and retirement, problem drinking, noise, air pollution, toxicology, radiation, administrative medicine, cancer as an industrial health problem, the relation of the general practitioner to industrial work, dental health, the medical witness in the courtroom, death patterns in industry, respiratory protection and engineering and analytical chemistry as related to industrial health, together with numerous other subjects of present day medical and scientific importance.

More than 100 technical exhibits will be displayed throughout the Conference. The exhibits are designed to acquaint the industrial physician with all the latest developments in products and equipment that will aid him in his work.

The formal sessions—more than 40 in number—include symposiums and panel discussions on subjects of timely interest, special meetings of the various groups, and conferences of special committees. In addition, there will be meetings of company physicians—steel, oil, electric, auto—starting with the all day conference of General Motors physicians on Monday, 22 April.

Feature of the formal opening session will be the C. O. Sappington Memorial Lecture by Frank Curtis, Vice President, Monsanto Chemical Company, and Past President, American Institute of Chemical Engineers. The Donald E. Cummings Memorial Lecture will be given by H. P. Schrenk, Ph. D., Industrial Hygiene Foundation.

The annual Industrial Health Conference provides an unexcelled opportunity for postgraduate study of new ways to improve and preserve the health of the American worker. Its purpose is the continuing



Individuals desiring to attend the course may submit an application in letter form through appropriate military channels to the Surgeon General Department of the Army Washington 25 D C Attn Personnel Division

---

## Army Medical Officer Honored

Colonel William L Thompson MC USA (Ret) was honored on 9 February at a meeting of the annual combined session of the American College of Radiology and the Association of Teachers of Radiology at the Drake Hotel Chicago Ill He was presented a Special Award of Honor by the Board of Chancellors of the American College of Radiology for his outstanding achievement as Chief of the Registry of Radiologic Pathology at the Armed Forces Institute of Pathology The award read in part

Colonel Thompson exemplifies the highest attainments of judicious perceiving effort motivating the outstanding medical scientist His contributions to radiological education and training are invaluable his efforts on behalf of our specialty are beyond recompense the gratitude of his colleagues and friends is without qualification We all are in his debt

Colonel Thompson has been with the Armed Forces Institute of Pathology since his retirement in June 1950 as Chief of the Radiologic Pathology Section of the American Registry of Pathology

## NATIONAL INDUSTRIAL HEALTH CONFERENCE

The Twelfth National Industrial Health Conference will be held at Kiel Auditorium St. Louis Mo., 20-26 April 1957. These Conferences annually bring together the five organizations whose members are responsible for maintaining the health of the nation's industrial workers: the Industrial Medical Association, the American Industrial Hygiene Association, the American Association of Industrial Nurses, the American Conference of Governmental Industrial Hygienists, and the American Association of Industrial Dentists.

Some 200 of the country's leading specialists and experts in the complexities and technicalities of preventive medicine and hygiene in industry will present the latest findings and developments relating to occupational diseases and injuries, nonoccupational conditions in employment, mental health, psychologic testing, rehabilitation and physical therapy, geriatrics and retirement, problem drinking, noise, air pollution, toxicology, radiation, administrative medicine, cancer as an industrial health problem, the relation of the general practitioner to industrial work, dental health, the medical witness in the courtroom, death patterns in industry, respiratory protection and engineering and analytical chemistry as related to industrial health, together with numerous other subjects of present day medical and scientific importance.

More than 100 technical exhibits will be displayed throughout the Conference. The exhibits are designed to acquaint the industrial physician with all the latest developments in products and equipment that will aid him in his work.

The formal sessions—more than 40 in number—include symposiums and panel discussions on subjects of timely interest, special meetings of the various groups and conferences of special committees. In addition, there will be meetings of company physicians—steel, oil, electric, auto—starting with the all day conference of General Motors physicians on Monday, 22 April.

Feature of the formal opening session will be the C. O. Sappington Memorial Lecture by Frank Curtis, Vice President Monsanto Chemical Company and Past President, American Institute of Chemical Engineers. The Donald E. Cummings Memorial Lecture will be given by H. P. Schrenk, Ph.D., Industrial Hygiene Foundation.

The annual Industrial Health Conference provides an unexcelled opportunity for postgraduate study of new ways to improve and preserve the health of the American worker. Its purpose is the continuing

enlightenment of all who are interested in the broad and important field of industrial health—industrial physicians and surgeons industrial hygienists industrial nurses industrial dentists and representatives of management together with physicians in general practice who have industrial affiliations All are invited

Jerome W Schilling M D Medical Director Pacific Telephone and Telegraph Company Los Angeles and President Elect of the Industrial Medical Association is General Chairman of the Conference Richard A Surter M D St Louis is Deputy General Chairman The complete program may be obtained by writing E C Holmblad M D Managing Director Industrial Medical Association 28 East Jackson Boulevard Chicago 4 Ill

---

## DEATH

COHEN Sidney Hillel Command r MC USN of Brooklyn N Y stationed on U S S *Saratoga* (CVA 60) graduated in 1943 from University of Rochester School of Medicine and Dentistry appointed a Lieutenant (junior grade) in the Naval Reserve 3 December 1943 and ordered to active duty 15 October 1944 released to active duty 28 July 1948 recalled to active duty at his own request 1 January 1950 and transferred to the regular Navy on 5 July 1950 died 1 February 1957 age 36 at the U S Naval Hospital St Albans Long Island N Y of myocardial infarction

## DENTAL ASSOCIATION OFFICIAL VISITS AIR FORCE BASE

Dr William R Alstadr, President Elect of the American Dental Association (center of photograph) visited Little Rock Air Force Base Ark , on 29 January 1957 He was accompanied by Dr Ernest D Jernigan President of the Central District Dental Society and Dr Fred R Bollen, Secretary of the Society



All dentists stationed at the Little Rock Air Force Base are members of the American Dental Association and take an active interest in district and state association affairs

## CORRESPONDENCE

*The article by Lieutenant Colonel John W. Burkett MC USA on "Clinical Recognition of Early and Insidious Schizophrenia, which was published on pages 1759 to 1763 of the December 1956 issue of this Journal appears to have aroused considerable interest. It was abstracted on page 54 of the 31 December 1956 issue of Newsweek and also evoked a letter to the editor that we consider to be a well thought out extension of Colonel Burkett's position—Editor*

*To the Editor —Dr. Burkett's article has not failed to leave a definite imprint on the thinking and feeling of the medical staff at these writers' duty station, a major naval hospital called upon to evaluate and treat a good number of schizophrenics. Not only psychiatrists but also general medical officers have a frequent occasion to encounter similar problems and it is their concern with the matter that led these writers to give a brief answer to the ideas expressed in the article.*

Quite judiciously, Dr. Burkett pointed out that a variety of symptoms can be the early signs of schizophrenia. He also stated explicitly in the summary that none of these are by themselves pathognomonic for the disease, yet the emphasis placed on them has aroused understandable concern in many medical officers who daily see these symptoms and at once come to suspect a deep seated psychosis instead of a mild neurotic symptom that should be handled supportively. It is a not unusual experience on neuropsychiatric services of hospitals like this one to receive intransfer patients who have already been given diagnoses of schizophrenia when the problems in reality are the consequence of character disorders of various kinds. Under appropriate management they typically quiet down within a day or two and this opens the way for further treatment and/or judicious disposition.

In order to clarify the issue of early schizophrenia and its recognition a few considerations seem to be appropriate. In present day thinking schizophrenia is generally seen as a malignant disorder of thinking the main feature of which is a disintegration of the personality structure. The process may progress steadily, may remain stationary, or may reverse itself with more or less full recovery. Its main characteristic is the *depth* of the disturbance and not its manifestations. Bleuler's distinction between the primary and secondary symptoms although now partially superseded by newer research makes this particular point very clear. The psychoanalytically oriented psychiatrists, moreover, have shown that the problems with which schizophrenic patients

---

Bleuler E. P. *Textbook of Psychiatry*. Author ed. English edition by A. A. Brill.  
Dover Publications Inc. New York N.Y. 1951.

grapple are basically the same as those of the neurotics and of mankind in general. It is only their way of dealing with them which reveals the actual breakdown of the personality structure. The so called defense mechanisms or the ways of dealing with problems, are many and varied, and it is well accepted that normal people, neurotics, and schizophrenics can use the same kinds. Unfortunately therefore we cannot classify certain kinds of reaction patterns simply as schizophrenic or neurotic.

There is however a difference in obviousness which can serve as a guidepost for any examiner who is called upon to evaluate a man's mental disease in a short and practicable time. Frank delusions, as everyone knows, are likely to be schizophrenic, in the absence of toxic or organic findings. Distortion of reality and projection often occur in psychotics in an obvious form. Yet they can occur in neurotics also, although sometimes difficult to discover. Anxiety in various forms, such as "shaking spells," apprehension, or manifest physical signs, is also a fairly common human response under certain stresses, and the task of the physician is to evaluate its depth and its disruptive threat. Deep, free floating anxiety that does not subside when the secondary gains of a neurotic are realized, will strike anyone as more serious than the bidding of an immature personality to be freed of a stressful situation. The apparent absence of immediate secondary gain will often be a signpost toward a more malignant diagnosis. Schizophrenics often request return to duty in the face of obvious inadequacies in their functioning, whereas the more frequent character disorders will invariably seek discharge from service, in spite of their capacity for apparently satisfactory functioning.

It is not the purpose to establish solid and specific criteria for the diagnosis of early schizophrenia. This, in the writers' opinion, cannot be done at the present time when competent psychiatrists still hold many contradictory opinions. For the service medical officer required to assess a patient's mental symptoms quickly and accurately, certain main features must be kept foremost in his diagnostic thinking. They seem to us to be (1) the depth of the personality disintegration often correctly assessed by the patient's immediate associates, (2) the conspicuous pathology of certain defense mechanisms like distortion of reality and projection, and (3) a primitive type of anxiety which is unaffected and unalleviated by secondary gains and often appears incomprehensible or inappropriate to the casual examiner.

The author has, however, aroused considerable alarm among non-psychiatric medical officers by emphasis upon the nonspecific signs and symptoms of incipient (not borderline) psychosis. These general service medical officers are now naturally but unjustifiably doubtful of their ability to assess the importance of anxiety, hypochondriasis, conversion symptoms, and alcoholism. Since it is probably more damaging to the patient to be labeled psychotic in error than to defer a firm diagnosis, even though appropriate treatment may be thereby postponed, it is probably most prudent to continue leaving the diagnosis of incipient

psychoses and borderline states to the experienced psychiatrists. While early recognition and treatment are surely desirable in all branches of medicine this problem has little if any emergency importance such as found in acute surgical crises

Dr Buxett has performed a useful service in stirring interest in and discussion of an important aspect of psychiatry

LYNN S. BEALS Jr Captain MC, USN  
and

JACOB CHRIST Lieutenant MC, USNR  
U S Naval Hospital Chelsea 50 Mass

---

## Air Force Nurse Awarded Legion of Merit

By direction of the President Captain Antoinette M A Fears USAF (AC) has been awarded the Legion of Merit for exceptionally meritorious conduct in the performance of outstanding service in the Caribbean Air Command during the period 10 August 1954 to 18 July 1956.

Captain Fears in 16 emergency or rescue missions with the U S Air Force Air Sea Rescue Service rendered distinctive and professional services displaying disregard for her own personal safety in the face of very hazardous conditions. On several occasions her outstanding performance was directly responsible for the saving of a life. Captain Fears has reflected a great credit upon herself and the Medical Service of the United States Air Force.

## Reviews of Recent Books

A TEXTBOOK OF PATHOLOGY by *E T Bell* M D Contributors *B J Clawson*, M D, and *J S McCartney* M D 8th edition 1 028 pages 545 illustrations and 5 plates in color Lea & Febiger Philadelphia Pa 1956 Price \$14 50

This new edition follows the same pattern of organization and development of general and systemic pathology as did the seventh edition. There have been alterations and additions reflecting recent advances and developments particularly in the hematologic and metabolic sections. References to recent contributions to the literature are made with a large proportion dating back to 15 to 20 years ago.

The text is well organized and is clearly and comprehensively written. Its numerous illustrative photomicrographs, drawings and plates are well chosen. Its presentation is consistent with the needs of the medical student, the resident and the clinician desiring a concise review of the basic principles of pathology with a minimal emphasis on problematical and controversial issues.

—NELSON S IREY Lt Col MC USA

ETIOLOGIC FACTORS IN RENAL LITHIASIS compiled and edited by *Arthur J Butt* M D F A C S 400 pages illustrated Charles C Thomas Publisher Springfield Ill 1956 Price \$12 50

This is an excellent and timely review of the factors in the etiology of urinary calculi. Dr Butt, while acting primarily as editor, has also contributed certain chapters from his vast experience in this field. The remaining chapters have been prepared by 20 contributors prominent in the field of urology and urologic research.

The subject is one of the oldest in the field of medicine. Although the book does not say the final word concerning the etiology of calculi, it does assemble a mass of information that cannot be found elsewhere in one volume. At the close of each chapter, many references are made to the literature from which the opinions are formed. The contributors frankly present divergent views so that one can form his own opinion regarding the etiologic factors of stone formation.

The book goes into the newer uses of the electron microscope and the flame photometer with reference to urinary colloids, and one chapter is devoted to the analysis of stones. It covers stasis, retention, metabolic disturbances, diet and environment in relation to stone formation. It leaves open the possibility that there still exists a common denominator for all stone formation which to date has not been found.



The editor brings out the fine original work which he has done with reference to hyaluronidase and the consequent release of hyaluronic acid

This is an excellent work for all interested in research on the subject of renal lithiasis particularly for those desiring to study the causes It should serve as a springboard for further studies in the field

—JOHN A SCHINDLER Col USAF (MC)

NEUROLOGICAL NURSING A Practical Guide by John Marshall M D  
M R C P M R C P Ed D P M 166 pages illustrated Charles  
C Thomas Publisher Springfield Ill 1956 Price \$3 75

This textbook is intended for nurses doctors physiotherapists and others who are concerned with the general management of patients suffering from neurologic disease The author points out that the nurse has an important part to play in the wider therapeutic approach to neurologic diseases and a responsibility for educating the patient in the management of his disability

This small 166 page textbook does not attempt to deal with detailed accounts of the anatomy and physiology of the nervous system or with extensive descriptions as signs and symptoms of neurologic disease It is entirely concerned with the practical problems encountered in the care of these patients Clear and concise instructions in the management of neurologic problems including specialized techniques are outlined for the nurse The book is well illustrated with black and white photographs and excellent sketches demonstrating proper positioning of the patient There is a particularly noteworthy chapter on the psychologic approach to the patient with neurologic disease This text is strongly recommended for both student and graduate nurses

—VERA E THOMPSON Lt Comdr NC USN

CONCISE ANATOMY by Linda F Edwards Ph D 2d edition 507 page  
illustrated McGraw Hill Book Co Inc New York N Y 1956 Price  
\$6 50

In 502 pages the author has covered the field of human anatomy in a surprisingly detailed manner As one would expect from the title the book lacks the greater detail and reference value of a *Gray's Anatomy* or of other standard texts Following a short introduction the book is divided into six parts dealing with general anatomy the superior extremity the inferior extremity the head the neck and trunk and the splanchnic structures At the end of each chapter there is a brief discussion of applied anatomy Descriptions of anomalies and the relationships of the various structures are brief or omitted

The text is written in a clear concise and readable manner Except for a colored plate of normal blood cells the illustrations are all black and white most are from *Morris Human Anatomy* The illustrations are

generally adequate, but a few could be improved by color. The printing and binding are well done. Because it lacks many details found in the larger texts, the book is not recommended for medical students or as a reference work. However, nurses and students of the biological sciences generally will find this a useful text.

—HUGH B. HOEFFLER Lt Col MC USA

**PEDIATRICS** edited by *Donald Paterson M D* and *John Ferguson McCreary M D* with 36 contributing authors. 654 pages illustrated. J. B. Lippincott Co. Philadelphia, Pa. 1956. Price \$14.

The work of a number of Canadian authors, this 654 page textbook is easily read and well indexed and should appeal first to the general practitioners of medicine. There are numerous illustrations of good quality and a complete bibliography. Emphasis is placed on diagnosis and treatment of the commoner conditions, with rarities being mentioned but not elaborated on. The section on poisoning could be more complete and that on fluid and electrolyte more detailed. Problems of the newborn, ophthalmic and orthopedic, receive suitable attention in the text with many ophthalmic illustrations which are excellent.

Considering diseases due to prenatal factors, an excellent table is provided listing the clinical disease, approximate incidence, and pedigree pattern. The commoner problems of the alimentary tract are well presented together with excellent roentgenograms. A thoughtful discussion of the respiratory system is given with many good roentgenograms of the major problems. Allergies, asthma, allergic rhinitis, and eczema receive good coverage. The anemias of infancy and childhood are discussed well and also presented in tabular form.

Diseases of the nervous system, mental retardation, and behavior disorders receive practical consideration in this volume while at the end of the book there are tables of drug dosage, blood plasma and serum values, liver and kidney function tests, and various suggested diets. The book is well written, orderly, and practical.

—MILTON KURZROK Capt MC USN

**PROGRESS IN RADIOBIOLOGY** Proceedings of the Fourth International Conference on Radiobiology held in Cambridge on 14th to 17th August 1955, edited by *Joseph S. Mitchell*, *Barbara E. Holmes* and *Cyril L. Smith*. 557 pages illustrated. Charles C. Thomas, Publisher, Springfield, Ill. 1956. Price \$12.75.

This volume is the record of the Fourth International Conference on Radiobiology convened at Cambridge, England, in August 1955. The authors have attempted to present a coherent, readable picture of the Conference and have reprinted a good deal of discussion by the delegates after each paper. The inclusion of this detailed discussion is unusual in formal publications, but, for this reviewer, added immeasurably to the value of the papers and was well worth the editorial effort.

The data presented is almost entirely new and includes the contemporary work of over one hundred radiobiologists representing 20 countries. Subject material encompasses a significant portion of the field including biochemical and enzymatic applications as well as effects on the total subject from bacteria to man. Special sections are devoted to genetics, carcinogenesis, protection and human data. Throughout the book emphasis is on the relationship of radiobiology to the field of clinical medicine and where appropriate practical extensions of laboratory work are suggested or recommended. Some of these suggestions are certainly tentative but it is refreshing to see the development of a closer relationship between the biologist and the clinician.

Although this book is of primary value to the radiobiologist it is felt that the radiologist as well as other physicians interested in the effects of radiation on man will find many of the fundamental principles discussed clearly and concisely and will gain an appreciation of some of the current problems and controversies.

—JAMES B HARTGERING Lt Col MC USA

**DIABETES MELLITUS** Handbook for Physicians by Howard F Root MD, Sc D, F A C P and Priscilla White MD, Sc D, F A C P 346 page. Landsberger Medical Books Inc New York N Y 1956 Distributed solely by The Blakiston Division of the McGraw Hill Book Co Inc New York N Y Price \$7

This book is meant to be a handbook for the daily use of physicians and accomplishes its object very well. It succeeds in giving a good picture of all the usual findings in the disease as well as giving a brief but good account of many complications. Since it is intended to be practical and immediately useful it is somewhat didactic but mentions alternate procedures usually giving the authors arguments against them.

The authors point out the value of determining the postprandial blood sugar as against the standard fasting test. They call attention to the need for complete examination of the patient who may have a variety of symptoms caused by diabetes. The book points out the need of repeated follow up and observation. Diet is handled in a short sensible chapter. The early use of insulin in the disease is urged on the basis that the patient will appreciate that his disease is serious and requires constant attention.

There is mention of the new insulin saving sulfonamide derivatives the usefulness of which is still being investigated. Especially interesting were the observations on diabetic neuropathy. The relationship of infections, anesthesia and surgery to insulin resistance is discussed. The danger of nephropathy in long term diabetics is brought out as well as the handling of diabetics facing operation.

There is ample space given to the endocrine method of treating pregnant diabetic women with statistics of the excellent results obtained by the authors. This method has not been always successful in the hands of others.

The authors have followed a great number of diabetic children for many years, and the inevitability of vascular and kidney damage is obvious. The authors are optimistic that future discoveries may improve this picture. This is an impressive and useful little book which any physician would enjoy. —JAMES L. TOBIN Col USAF (MC)

**HEAD INJURIES AND THEIR MANAGEMENT** by Francis Asbury Echlin, M D C M M Sc Med Sc D F A C S 127 pages illustrated J B Lippincott Co Philadelphia Pa 1956 Price \$3

This small handbook briefly describes the essentials in diagnosis and treatment of head injuries making this knowledge easily accessible and of practical value to interns residents and surgeons.

Sections on the mechanisms of head and brain injury nonsurgical lesions of the brain and surgical conditions such as lesions of the scalp skull fractures hematomas and penetrating wounds of the brain, surgical complications of head injuries, such as wound infection skull defects, and posttraumatic epilepsy give concise but little more than introductory discussions of the problems. The diagnostic procedures of encephalography and angiography are little more than mentioned.

Even as a guide the book is inadequate and will not fit the needs of a physician on whom rests the responsibility of diagnosing and treating head injuries. —FRANKLIN M. ROBERTS Lt MC USNR

**SIMPLIFIED NURSING** by Florence Dakin R N and Ella M. Thompson B S R N, with the assistance of Margaret LeBaron R N 6th edition 800 pages illustrated J B Lippincott Co, Philadelphia Pa, 1956 Price \$4.50

This book has been revised and brought up to date to keep pace with new developments in medical care and the changing concepts in the training and the utilization of practical nurses in the home and the hospital.

The format is essentially the same as in earlier editions but much new material has been added. More information has been included concerning the structure and functions of the body. Since the development of many new drugs affecting the treatment and care of patients the section on drugs has been considerably increased.

Other material revised in this comprehensive text includes the status of the practical nurse as a member of the health team in the hospital and the community. Throughout the book emphasis is placed on the care of the patient as a person—a human being who has personal problems and emotional reactions—and on the need for the practical nursing student to make personal adjustments and establish good report.

In the presentation of nursing procedures the two column format which includes "Suggested Procedure" and "Key Points" has been

retained. The whole text is easily read and very understandable making it particularly valuable to the student practical nurse. There is an excellent detailed index and a list of references for further study.

This book is highly recommended as a useful guide for the instructor of auxiliary nursing personnel as well as a text for the practical nursing student. —AILEEN E. BRIMMER Maj USAF (MC)

**PRACTICAL PEDIATRIC DERMATOLOGY** by Morris Leider M D 433 pages 260 photographs and 13 drawings. The C. V. Mosby Co. St. Louis Mo. 1956. Price \$10.50.

This book, a first edition, will be most appreciated by the busy pediatrician and general practitioner. Although embracing very little that is new or original in the management of skin diseases in children, the frequent use of charts and tables in presenting the material will be a timesaver for many. It is not intended to replace the more encyclopedic works for the specialist, but is written with practical purposes foremost in mind. Even so, the author admits encountering difficulty in deciding what subject material to omit from the book.

The final chapter attempts to cover a miscellany of uncommon dermatoses of infants and children. In this one chapter over one hundred dermatoses are briefly described.

The book is arranged in 14 chapters, generally grouped according to broad etiology. It is completed in 433 pages. The photographs are good. —CLAUDE B. WHITE Col USAF (MC)

**THE YEAR BOOK OF PEDIATRICS (1956-1957 Year Book Series)** edited by Sydney S. Gellis M D 480 pages illustrated. The Year Book Publishers Inc. Chicago Ill. 1956. Price \$6.75.

This book is a representative review of the American and foreign pediatric literature from June 1955 through May 1956. This volume is similar to and compares favorably with previous and companion volumes. The abstracts are conveniently arranged according to the body systems in 18 well indexed sections. The editor has done very well in preparing and compiling 335 abstracts of the best and most representative papers in the current pediatric literature. The volume is suitable as a quick and ready reference and as a guide to determine the trend in recent pediatric treatment and diagnostic methods.

Dr. Gellis is to be congratulated for accomplishing the Herculean task of abstracting and compiling pertinent pediatric literature in such a complete, convenient, and well organized manner. One of the most valuable features is the editorial comment following most of the more important papers presented. The value of this volume is greatly enhanced by the interspersing of comments by many guest authorities on the more controversial subjects.

This book is recommended for all students and physicians interested in the most up to date information in the field of pediatrics. While not a reference book it presents much practical information in a concise and readily accessible form. —WILLIAM I NEIKIRK *Comdr MC USN*

**A GUIDE FOR PSYCHIATRIC AIDES**, by *Charlotte R Rodeman R N M Ed*  
234 pages The Macmillan Co, New York N Y 1956

This book is of great value to a nursing instructor who is responsible for the training of nonprofessional personnel assigned to the care of psychiatric patients. It also provides an excellent guide for the individual worker. The text is well written in clear understandable terms which can easily be grasped by the beginner.

The author has continually emphasized the attitudes and relationships of the attendant in respect to the nursing care to be administered. The material is divided into 11 chapters followed by a glossary, bibliography, and index.

Since tranquilizing drugs are now being used effectively in the treatment of psychiatric patients the value of this book as a guide might be increased by adding another chapter on nursing care in this area. Despite this however the book is excellent and should be well received.

—ELEANOR WELCH *Maj USAF (NC)*

**CLINICAL ENDODONTICS** A Manual of Scientific Endodontics by *Ralph Frederick Sommer D D S M S F A C D F A A O R F* and *Darl Ostrander A B D D S M S F A C D* and *Mary C. Crouley A B M S P H* 514 pages illustrated W B Saunders Co Philadelphia Pa 1956 Price \$10.50

In the preface the authors state that it is their intention to approach the subject of endodontics by integrating the preclinical demonstrations with the actual clinical practice. It is the reviewer's belief that this is accomplished in an extremely satisfactory manner.

The book is divided into 22 chapters which cover the subject from a history of root canal therapy to a brief discussion of the principles of prescription writing. Not only does this book discuss the technique of root canal management but also the histology and histopathology of the dental pulp and periapex.

Line drawings, x rays, and photographs are well related to adequately develop each new subject. The x rays are particularly worthy of note, they are well chosen, clearly reproduced, and are provided with brief and clear legends.

Chapters devoted to the fields of bacteriology and pharmacology are very well done and will be of great value to general practitioners as well as endodontists. Included is an up to-date review of the antibiotics and chemotherapeutic agents. In the chapter devoted to the roentgenographic diagnosis of periapical lesions the authors clearly dispel a

misconception regarding the ability of the clinician to differentiate radicular cysts from dental granulomas by x ray. The separation of these lesions by histologic examination is emphasized. This information is available because of the co-operation of the authors with a very able oral pathologist. The reader will find this chapter stimulating as well as illuminating.

This book is to be recommended to all general practitioners of dentistry, endodontists and senior dental students.

—WILLIAM G. SPRAGUE, Capt. USAF (DC)

PERSONALITY, STRESS AND TUBERCULOSIS, edited by Phineas J. Sparer.  
M. D. 629 pages, illustrated. International Universities Press, Inc., New York, N. Y., 1956. Price \$12.50.

This book brings together selected topics by authors well qualified to review current thought, practice and research in the various fields related to tuberculosis. Chapters on the psychiatric, psychological and psychosomatic, as well as physicochemical and endocrine aspects of the disease are included. Considerable material of practical significance is discussed, including irregular discharges and rehabilitation. The many problems that arise in relation to the alcoholic tuberculous patient are well presented.

In a volume of this type there is of necessity considerable repetition of material, especially in those chapters discussing the personality attitudes and emotional reactions of tuberculous patients.

While there is little that is actually new in this volume for those who are working actively in the field and staying abreast of the current literature, it should serve as an excellent review of the interdisciplinary approach to the tuberculous patient. The book will also prove extremely valuable as a ready reference volume because of the comprehensive review of the literature.

One criticism might be that too little space is given to the problem of motivation in these patients. One wonders what the recovery rate might be if a sizeable monetary award were given for recovery. It is fairly well proven that service-connected cases tend to leave the hospital before recovery rather than lose their service-connected monetary disability benefits. The early monetary settlement of accident claims by insurance companies has certainly tended to definitely reduce chronic invalidism in many cases.

It continues to appear that we may well have been wrong in fostering regression in the active tuberculous patients. The old days of absolute bed rest may finally be replaced by physical activity within reason. This book is strongly recommended for all those who are interested in the successful treatment of the tuberculous patient.

—PHILLIP B. SMITH, Lt. Col., A. C., USA

**PREPARING FOR MOTHERHOOD** A Manual for Expectant Parents by  
*Samuel R Meaker* M D 196 pages illustrated The Year Book Pub-  
lishers Inc , Chicago Ill 1956 Price \$2

This manual for expectant parents presents stimulating and detailed helpful advice for every expectant mother from the time of conception through the puerperium. It is designed to educate the parents and create understanding and co operation between them and their attending obstetrician.

Its 200 pages are written in an easily readable and personal style by Dr Meaker who has thoughtfully presented information adaptable to and supplementary to any of the usual methods of prenatal and obstetrical management. He adequately covers all the information expectant parents need to know including early and late signs of pregnancy expected physical and psychologic changes precautions and care during various stages of pregnancy methods and reasons for psychologic preparation for labor and for various analgesics and anesthetics the relief of common discomforts and many other details.

Dr Meaker has succeeded in giving us a welcome complete and pleasantly styled manual to supplement physicians advice to their patients —*DWIGHT A. CALLAGAN* *Comdr MC USN*

**ATLAS OF PLASTER CAST TECHNIQUES** by *E E Bleck* M D *Nellie Duckworth* and *Nancy Hunter* 128 pages illustrated The Year Book Publishers Inc Chicago Ill 1956 Price \$4 75

This manual is intended for the novice in plaster technics and the occasional user of plaster immobilization. It is presented in the form of a spiral binder and printed on heavy glossy paper. In addition to the discussion of extremity and body casts it contains chapters on plaster of parts plaster room equipment general technics wedging casts complications removal of plaster casts bibliography index and a concise appendix covering supplies their sizes and sources.

The narrative part of the manual comprises less than 20 per cent of the space the bulk of the material is presented in the form of a series of excellent step by step photographs accompanied by concise legends.

Technically the authors have well achieved what they set out to do to be of help to internes residents plaster nurses and plaster room orderlies.

The material discussed carries considerable authority springing primarily from 32 years experience at the North Carolina Orthopedic Hospital where most of the basic ideas presented were developed. But beyond that much that was developed and refined in the South is incorporated such as the Hoke Well Leg Traction or Kites Wedging Cast Treatment for the congenital clubfoot.

Brevity and clarity of presentation enhance the definite value of this work —*ERNST DEHNE* *Lt Col MC USA*



THE MERCK MANUAL of Diagnosis and Therapy edited by Charles E Lyght  
M D 9th edition 1888 pages 20 main sections each thumb-indexed  
Merck & Co Inc Rahway N J 1956. Price \$6 75

As most medical students and house officers know a great variety of information is readily available in this small compact book It is an immediate on the spot guide with reference to current literature and standard texts for more complete discussions The manual provides up to-date medical information in a convenient concise yet adequate form

The format of the new edition is similar to that of the 1951 edition Diagnosis and therapy are given primary emphasis but pertinent physiologic pathologic and etiologic factors are included Readily applicable advice on the treatment of medical emergencies burns poisoning and shock greatly enhance its usefulness In addition to several new chapters many new illustrations diagrams and tables have been included

A more complete and useful handbook covering such a wide variety of general medical subjects is not available in any book of this size  
—FRANKLIN M ROBERTS Lt MG, USNR

HOMOSEXUALITY Disease or Way of Life? By Edmund Bergler M D 302 pages  
Hill and Wang Inc New York N Y 1956 Price \$5

The author contends that there are four factors which have made the problem of homosexuality more important for us today than it was 10 years ago First there has been some awakening to the seriousness of the problem even though there is still great general ignorance on this subject Second there are many incipient homosexuals who have become confirmed homosexuals through the dissemination of inaccurate false and misleading information Third homosexuality is at the root of a new and increasing kind of marital tragedy that in which a homosexual marries an unsuspecting male The most important of the four premises is that homosexuality is a psychiatric illness coming into the area of treatment and cure In this book the four points indicated above are projected in the light of Dr Bergler's vast psychoanalytic experience There is much illustration and amplification of his view of the psychodynamics psychopathology and psychoanalytic treatment of both male and female homosexuals

At times this reviewer felt that Dr Bergler might better have written two books one for lay consumption and one for professional readers Much of the psychoanalytic material seems too complex too repetitious and too unenlightening for the lay reader while there is some material which is old and somewhat boring for the psychiatrist  
This book is recommended to the medical profession and to the lay reader who requires more information on the subject  
—ROBERT E SWITZER M D

**THE YEAR BOOK OF OBSTETRICS AND GYNECOLOGY** (1956-1957 Year Book Series) edited by *J P Greenhill* MD FACS FICS (Honorary) 592 pages illustrated The Year Book Publishers, Inc, Chicago, Ill, 1956 Price \$6.75

This book merits nothing but high praise. It is in an easily readable style, the abstracts cover the domestic and foreign literature from July 1955 to July 1956 and give the essence of the original article effectively. The frequent editorial footnotes reflect a conservative approach to the problems in this field and also a great wealth of personal experience.

The Year Book can serve as "the bible" for the busy general practitioner as well as the residents and specialists in this field.

—HENRY J HUNTER Capt MC USN

**GLAUCOMA** Transactions of the First Conference December 5, 6 and 7 1955 Princeton N J Edited by *Frank W Newell* MD Sponsored by the Josiah Macy Jr Foundation New York N Y Josiah Macy Jr Foundation Publications New York N Y, 1956. Price \$4.50

The goal of these conferences, as organized by the Josiah Macy Jr Foundation, is to bring together scientists for the promotion of communication and exchange of ideas on research dealing with some urgent problem in medicine and health. This book deals with the subject of glaucoma. The transactions are published in order to share the conference process with a larger audience than could participate personally.

The format of the book is excellent. It is divided into three sections: (1) a review of angle-closure glaucoma, (2) central control of intraocular pressure, and (3) physiologic and pharmacologic factors influencing the resistance to aqueous outflow. Each subject is introduced by an authority who acts as chairman for the discussion, and the dialogue is printed verbatim. The discussion may proceed along a single viewpoint, or it may veer off in a different direction as the influence of an allied scientist becomes evident. At the end of each section there are voluminous references which are excellent source material for the researcher, teacher, and ophthalmologist. The first section will hold more interest for the practicing ophthalmologist than the others, particularly the discussion dealing with classifications, trigger mechanism, and interrelationship of blood pressure and intraocular pressure.

The other two sections will hold more interest for the researcher and teacher in the field. It is believed that this style of conference technique will prove interesting and stimulate discussion. Some will object to their trend of thought being interrupted, and the discussors inability to arrive at conclusions. A good deal of time and space is consumed in the explanation of research apparatus and techniques.

The book is definitely applicable for the research and teaching ophthalmologist. While the average practicing ophthalmologist will not find its contents readily usable, he will find his interest and greatly aroused and his powers of observation and ledge enormously increased. —AUBREY L JENNINGS Col MC

**SURGERY FOR GENERAL PRACTICE** by Victor Richards M D 947 page  
476 illustrations The C V Mosby Co St Louis, Mo 1936 Price  
\$17 50

This text on surgery encompasses almost the entire field of surgery ranging from seemingly minor ailments to life-endangering catastrophes. The book is well written readable and is adequately illustrated with clean and simple black and white sketches and drawings. The author has written the major portions of the book drawing on over 10 years experience at the Stanford University Surgical Outpatient Clinics.

The majority of chapters are prefaced with clear and concise discussions on applicable anatomy basic physiology and/or general concepts of treatment. For each condition discussed the author usually mentions several of the presently accepted modes of treatment dwelling a slightly greater length on one of these modes. Although this is not a book of operative technics many so called minor technics for office work are described in detail.

The author has done an admirable job discussing present day concepts of pathologic physiology diagnosis and treatment. It is felt that this book will be valuable to physicians in general practice and will help them understand evaluate and treat surgical condition — CLINTON S LYTER Col MC USA

**PRESCRIPTION WRITING AND MATERIA MEDICA FOR DENTISTS** by  
L. Richard Cipes Ph.G DDS 4th edition 624 pages illustrated  
Dental Items of Interest Publishing Co Inc Brooklyn NY 1956  
Price \$9 50

In revising the third edition, the author states that it is the responsibility of the conscientious dentist to acquaint himself with the new drugs and their administration for the relief of pain control of infection and treatment of other conditions affecting the state of health of the oral cavity and the individual.

In logical sequence the author gives the prescription writing the reasons for prescribing the materia medica of dentistry and the method of prescribing drugs.

The section on antibiotic therapy is an excellent reference and the chapter on dental formulas gives much useful information. The author has included a very comprehensive section on prescription writing from which all dentists can benefit.

This book is well written in a clear concise and easily readable style. The type paper and binding are good. The illustrations tables and graphs are clear and pertinent. A short but adequate list of references is given.

This book should provide interesting and useful information to the dental student and practicing dentist and offers a good reference to dental materia medica — RICHARD J BURCH Col USAF (DC)

**ADRENAL FUNCTION IN INFANTS AND CHILDREN** A Symposium edited by Lytt I Gardner M D 221 pages illustrated Grune & Stratton Inc New York N Y , 1956 Price \$6 75

This book is a complete transcription of a symposium held in Syracuse N Y , in November 1954 At this meeting an attempt was made to correlate what is known of adrenal function in infants and children It succeeded beautifully The subjects covered vary from those of academic and theoretic interest such as the origin of the ketosteroids and the nature of the enzymic deficiencies in the adrenogenital syndrome to subjects of considerable clinical interest and importance such as the surgical treatment of pseudohermaphroditism Throughout all the various sections of the book one finds bits of information which are not available elsewhere and which are important to people working in the field for instance, the difference in the pattern of excretion of 17 ketosteroids in premature and full term infants The book has been carefully edited with the important discussions being presented verbatim These are of great interest for they illustrate the differences of opinion among the authorities in this field and the vast areas which remain to be investigated before the problem of adrenal function in children can be clearly understood If the book has any deficiency, it lies not in the work of several authors or the editor but in the undeveloped state of our knowledge at the present time

—DANIEL STOWENS Maj MC USA

**The Laboratory Diagnosis of COAGULATION DEFECTS** by Pietro De Nicola, M D A Monograph in The Bannerstone Division of American Lectures in Pharmacology edited by Chauncey D Leake Ph D 240 pages 62 illustrations and 26 tables Charles C Thomas Publisher, Springfield Ill 1956 Price \$7 50

The author of this volume by virtue of his wide experience in the experimental and clinical field of coagulation defects is well qualified to analyze and present the complex physiology and physiopathology of this field The problem is a difficult one in that work in this field is continuing at a rapid pace Dr De Nicola has approached this problem by dividing his book into five parts Physiologic background description and interpretation of the general methodology special diagnosis of coagulation defects analytic description of the technics employed and a summary The first three sections are exceptionally well presented and serve as an excellent reference manual for the study of the problems of hemostasis The technical section suffers from the fact that the author is such an excellent technician himself and his descriptions of the diagnostic tests presume that the reader has had some experience in this field The neophyte might have some difficulty The section does contain five excellent tables on equipment and reagents required for the 30 tests described A selected bibliography is included This volume is recommended to coagulationists and others who are faced with the problem of unraveling problem in hemostasis —JOSEPH H AKEROYD Lt Col MS

WIRE BRUSH SURGERY In the Treatment of Certain Cosmetic Defects and Diseases of the Skin by James W. Burks Jr. M. S. M. D. American Lecture Series Publication No. 300 A Monograph in the Binnerstone Division of American Lectures in Dermatology edited by Arthur C. Curtis M. D. 154 pages illustrated Charles C. Thomas Publisher Springfield Ill. 1956 Price \$6.75

It is intellectually stimulating to review a monograph such as this one written in such an interesting and concise manner on the well advertised procedure of skin planing. The monograph presents from a medical standpoint the detailed facets of wire brush surgery from its history through future trends including anatomy, histopathology, psychology, equipment, anesthesia, and technique. It will prove to be of interest to physicians with experience in the procedure and of an absolute necessity to students and other physicians thinking of initiating this procedure in their clinics or practices.

The two purposes of this monograph—to summarize the experience of the pioneers in abrasive surgery and to present the author's personal experience in over 750 planings—have been accomplished. The author's attempt to apply academic knowledge of the basic sciences to the clinical procedure has also substantially succeeded.

Certain differences of opinion are bound to arise among physicians experienced in this procedure. The author himself was not too clear about whether to bandage or not to bandage. In the chapter "Psychological Aspects of Planing" the use of bandages is recommended in certain instances and for certain periods as is the use of an antibiotic ointment. However, in the chapter on "Postoperative Care" bandaging is not recommended, which I believe is in agreement with other experienced operators. The author also presents the belief that a fundamental psychological change can be expected as a result of planing. In my experience a superficial psychological change has proved to be the rule.

In one chapter lesions other than scars are discussed. Some of these include nevi, epitheliomas, and lupus erythematosus. This portion of the book is particularly suited to dermatologists and others with long experience in the diagnosis of skin lesions. I believe it should be emphasized that the results of planing epitheliomas in the author's hands may be entirely different than in those treated by relatively inexperienced operators. Positive diagnosis of all cases of nevi, tumors, and other conditions should be made prior to any decision concerning treatment.

The black and white photographs are excellent; all procedures are well illustrated. This monograph is a primer for all interested in the technique of skin planing.—ROBERT E. LYONS, Col. USAF (MC)

**CONTROLLED HYPOTENSION\* IN ANESTHESIA AND SURGERY** by David M. Little Jr. M.D. A Monograph in The Bannerstone Division of American Lectures in Anesthesiology edited by John Adriani M.D. 159 pages illustrated Charles C. Thomas, Publisher Springfield, Ill. 1956 Price \$4.50

With the present day trend toward wide variations in the practice of anesthesiology and the attempts to alter patients' normal physiologic responses by drugs and techniques so as to provide apparently better surgical fields it is wise to step back occasionally and review our actions. That is the aim and accomplished purpose of this monograph. Dr. Little has first presented the problem which is blood loss during operation, with a brief discussion of some of the major causes. This is followed by a discussion of the control of bleeding. He outlines several methods of control by the production of hypotension.

Because deliberately produced hypotension is very recent in the practice of anesthesia and surgery few physicians have extensive experience in this technic. The comprehensive review of the literature therefore is sufficient of itself to make this monograph worthwhile. The medical reports are co-ordinated with the practical application of the principles. The chapter discussing the side effects on the vital organs and those chapters presenting the indications, contraindications, and complications have concise conclusions and leave no doubt as to the author's opinions concerning the use of hypotensive techniques.

The reviewer believes that this monograph should be included in the reference library of all physicians who are directly concerned with the care of those patients who seem to require hypotension for the accomplishment of necessary surgical procedures. Since rational and conservative use is advocated the reviewer also believes that definite patient benefit may be obtained by using the monograph as a guide in such practice. —HOWARD A. PEDIGO Lt. Col. MC USA

**DIAGNOSTIC METHODS IN VETERINARY MEDICINE** by George F. Boddie B.Sc. (Edin.), M.R.C.V.S. F.R.S.E. 4th edition 412 pages illustrated J.B. Lippincott Co. Philadelphia, Pa. 1956 Price \$6.50

The author, Professor of Veterinary Medicine at Edinburgh University, Scotland, has directed this book toward the veterinary student; however, it does contain much of interest to the practicing veterinarian. In the first part of the book clinical diagnostic methods are considered in connection with each system of the body, but the subject matter is treated with such generality and brevity that it loses interest. Each of these chapters is introduced by a very brief discussion of the regional anatomy, but unfortunately the influence of differences in anatomy upon diagnostic methods is seldom clearly stated.

Beginning with chapter 13 and continuing through the sections on clinical biochemistry and clinical hematology the approach to the subject is more direct and informative. The drawings taken from x-ray

films are rather simplified diagrams which bear so little resemblance to actual roentgenograms that they have limited instructional value. The anatomic drawings are useful for orientation but contain little detail. The drawings of smears of various bacteria in color on the other hand are attractive and informative. The print is readable and the text contains very few typographical errors.

This book will undoubtedly be of value to the veterinary student who is being introduced to diagnostic methods. He may also find it useful as a reference book after graduation.

—THOMAS C. JONES Lt Col. V.C. USA

**VIRUS DISEASES AND THE CARDIOVASCULAR SYSTEM** A Survey by Ernest Lyon M.D. 215 pages Grune & Stratton Inc. New York N.Y. 1956. Price \$5.75

In this scholarly book the author has admirably provided a comprehensive survey on the virus diseases and their cardiovascular manifestations. The book is well arranged. A fine foundation is provided by a chapter on viruses in general and associated cardiovascular involvement and a chapter on present cardiovascular concepts of virus diseases. The known viral diseases plus diseases of uncertain but possible viral etiology are developed in detail. Rickettsial infections are discussed with special reference to the cardiovascular system.

The book reflects the tremendous experience of the author who is to be congratulated on his adept manner in which he presents an exhaustive amount of material weaving in his experience and interpretation so that the wealth of reference data flows smoothly and with purpose.

Throughout this volume one is impressed with the basic importance of the capillary syndrome with resulting hypovolemia and its effect on the whole body. The importance of treatment with plasma expanders is stressed. The possibility of cardiac catastrophes as well as prolonged debility and convalescence in some of the viral diseases becomes apparent.

This book is not only valuable for its elucidation on cardiovascular manifestations but also for the fine review of the basic pathology and pertinent clinical data on virus diseases in general and their effect on the human being. It will be of interest to all who work in the field of virology and to internists and is a "must" for the cardiologist. Any reader will find a tremendous reward for his time and will gain a vast store of useful knowledge. An extensive bibliography follows each chapter adding much to its value for reference material.

—RICHARD I. CRONE C.I. MC USA

## New Books Received

Books received by the *U S Armed Forces Medical Journal* are acknowledged in this department. Those of greatest interest will be reviewed in a later issue.

- BRITISH MEDICAL BULLETIN**, Volume 13 Number 1, January 1957. Physiology and Pathology of the kidney. 74 pages illustrated. Published by the Medical Dept. The British Council, London W1, England. Distributed by Oxford University Press, New York, N Y. January, 1957. Price \$3.25.
- TEXTBOOK OF COLLEGE HYGIENE** by Oliver F. Byrd, Ed. D. M. D. 2d edition. 496 pages illustrated. W. B. Saunders Co., Philadelphia, Pa. 1957.
- PRACTICAL PHYSICS FOR NURSES** by George I. Sackheim, S. M. A. M. 206 pages illustrated. W. B. Saunders Co., Philadelphia, Pa. 1957.
- CURRENT THERAPY 1957**, Latest Approved Methods of Treatment for the Practicing Physician, edited by Howard F. Conn, M. D. and 12 consulting editors. 731 pages. W. B. Saunders Co., Philadelphia, Pa. 1957.
- CLINICAL ORTHOPAEDICS** No. 8 "Chronic Hereditary Diseases and Developmental Anomalies." Anthony F. DePalma, Editor-in-Chief. 337 pages illustrated. J. B. Lippincott Co., Philadelphia, Pa. 1956. Price \$7.50.
- PSYCHOLOGY OF HUMAN BEHAVIOR FOR NURSES**, by Lorraine Brady, Dennis B. S. R. N. M. S. 250 pages illustrated. W. B. Saunders Co., Philadelphia, Pa. 1957.
- MEDICAL STATISTICS OF THE UNITED STATES ARMY**. Annual Report of the Surgeon General, Calendar Year 1954. 344 pages. Will be furnished at no charge upon request to Chief, Medical Statistics Division, Office of the Surgeon General, Department of the Army, Washington 25, D. C.
- CORONARY HEART DISEASE**. Angina Pectoris. Myocardial Infarction. by Milton Plotz, M. D. F. A. C. P. Foreword by William Dock, M. D. 352 pages illustrated. Paul B. Hoeber, Inc., Medical Book Department of Harper & Brothers, New York, N. Y. 1957. Price \$12.
- POSITIONING IN RADIOGRAPHY** by A. C. Clark, M. B. E. F. S. R. 655 pages. 2150 illustrations. 7th edition. Grune & Stratton, Inc., New York, N. Y. 1956. Price \$29.
- FUNDAMENTALS OF CLINICAL NEUROPHYSIOLOGY**, by Paul O. Chaffield, M. D. 392 pages illustrated. Charles C. Thomas, Publisher, Springfield, Ill. 1957. Price \$8.50.
- The Clinical Management of VARICOSE VEINS** by David Woolfolk Barrow, M. D. with a Foreword by Arthur W. Allen, M. D. 2d edition, revised and enlarged. 169 pages illustrated. Paul B. Hoeber, Inc., Medical Book Department of Harper & Brothers, New York, N. Y. 1957. Price \$6.



**PRACTICAL PSYCHIATRY FOR INDUSTRIAL PHYSICIANS** by W Donald Ross M D B Sc (Med) F R C P (C) Foreword by Robert A Keboe B S M D Preface by Maurice Levine A M M D 401 pages Charles C Thomas Publisher Springfield Ill 1956 Price \$7.50

**HANDBOOK ON POLIOMYELITIS** by Joseph Trueta M D D Sc (Hon) (Oxon) F R C S (Canada) F R C S A B Kinnier Wilson, M A M B M R C P D P M and Margaret Agerholm, M A B M B Ch (Oxon) 139 pages illustrated. Charles C Thomas Publisher Springfield Ill 1956 Price \$3.75

**Principles and Techniques of REHABILITATION NURSING** by Florence Jo s Terry B A R N P T O T R Gladys S Benz R N M A. Dorothy Wereness R N M A Frank R Kleffner Ph D and Deborah MacLurg Jensen R N M A. (Editor) 345 pages illustrated The C V Mosby Co St Louis Mo 1957 Price \$5.50

**ULTRAMICRO METHODS FOR CLINICAL LABORATORIES** by Edu n M. Knights Jr M D Roder ck P MacDonal d, I h D and Jaan Ploompuu 128 pages illustrated Grune & Stratton Inc New York N Y 1957 Price \$4.75

**STRESS AND STRAIN IN BONES** Their Relation to Fractures and Osteogenesis by F Gaynor Evans Ph D American Lecture Series Publication No 296 The Bannerstone Division of American Lectures in Medical Physics edited by Otto Glasser Ph D 245 pages illustrated Charles C Thomas Publisher Springfield Ill 1957 Price \$6.50

**PRACTICAL OFFICE GYNECOLOGY** by Albert Decker M D D O G F A C S and Wayne H Decker M D D O G A Series of Manualographs Obstetrics & Gynecology edited by Claude E Heaton M D 388 pages 103 illustrations 19 in color F A Davis Co Philad lphia Pa 1956 Price \$10.50

**BASIC FOUNDATIONS OF ISOTOPE TECHNIQUE** For Technicians edited by W llard C Smullen M D F A C R 163 pages illustrated Charles C Thomas Publisher Springfield Ill 1956 Price \$4.75

**PRACTICAL DERMATOLOGY** by Samuel M. Peck B S M D with Lawrence L Palitz M D Ph D 380 pages illustrated Landsberger Medical Books Inc Distributed by The Blakiston Division The McGraw-Hill Book Co Inc New York N Y 1956 Price \$7

**VOCATIONAL COUNSELING WITH THE PHYSICALLY HANDICAPPED** by Lloyd H Lofquist 384 pages Appleton-Century-Crofts Inc New York N Y 1957 Price \$5

**SYNOPSIS OF PATHOLOGY** by W A D Anderson M A M D F A C P F C A P 4th edition 829 pages 328 text illustrations and 12 color plates The C V Mosby Co St Louis Mo 1957 Price \$8.75

**THE YEAR BOOK OF DRUG THERAPY (1956-1957 Year Book Series)** edited by Harry Beckman M D 514 pages illustrated The Year Book Publishers Inc Chicago Ill 1957 Price \$6.75

**MODERN OFFICE GYNECOLOGY** by George Bl n ck M D F A C S Sherwin A Kaufman M D F A C S 218 pages 47 illustrations & Febiger Philad lphia Pa 1957 Price \$4.50

**THE GIST OF OBSTETRICS** by H B Atlee M D F R C S. (Ed & C) F I C S. Illustrated by Garth Vaughan, M D C M (D I) 327 pages illustrated Charles C Thomas Publisher Springfield Ill 1957 Price \$6.

# UNITED STATES ARMED FORCES MEDICAL JOURNAL

*Published Monthly by  
the Armed Forces Medical Publication Agency  
Department of Defense*



*Editor*

CAPTAIN BENNETT F AVERY, MC, USN

*Associate Editors*

COLONEL ROBERT S ANDERSON, MC, USA

COLONEL PAUL V DAVIS, USAF (MC)

*Assistant Editor*

LIEUTENANT FRANKLIN M ROBERTS, MC, USNR

UNITED STATES

GOVERNMENT PRINTING OFFICE

WASHINGTON 1957

THE PRINTING OF THIS PUBLICATION HAS BEEN APPROVED BY  
THE DIRECTOR OF THE BUREAU OF THE BUDGET, 20 FEB 1956

## Monthly Message

I have recently read the book, *Social Science in Medicine*, by Leo W. Simmons, Professor of Sociology Yale University, and Harold G. Wolff Professor of Medicine (Neurology), Cornell University Medical College, published by the Russell Sage Foundation in 1964. I commend it to all of you.

In the chapter dealing with "Hospital Practice and Social Science Perspective," there is this statement:

We are now ready to conclude that medicine is potentially a social as well as a physical science and that successful medical practice depends on the former as on the latter disciplines.

Although applicable to all of us in medicine this becomes especially important for you who are with the Armed Forces where the problems dealing with sociology, social science, disrupted backgrounds and traditions, and new environments and social groups have a profound effect upon those who come to you for treatment. Frequently these sociological factors may well prove to be the initiating or continuing causes in a physical or organic ailment. Treatment for this latter by itself may be entirely unavailing, or only temporarily helpful unless the total sociological picture is considered. This applies not only to the dependent families but also to the members of the Armed Forces themselves.

These outside factors of social group and environment may play important roles in the health and behavior of the individual soldier, sailor, or airman as regards his daily life, in sudden changes in his action, or as to causation of serious or even fatal accidents.

*Frank B. Berry*

FRANK B. BERRY, M. D.  
Assistant Secretary of Defense  
(Health and Medical)

# Table of Contents

	Page
Doctor Samuel Adams Revolutionary Army Surgeon and Dierist— <i>Thomas M Hunter</i> .....	625
The Roentgen Demonstration of Duodenal Ulcer— <i>Edward R Heitzman Jr</i> .....	644
Introcordiac Surgery Using an Artificial Oxygenator— <i>Lourence M Rivkin Byron E Pollock Floyd W Baker and John M Solyer</i> .....	656
Mitral Commissurotomy at an Army Hospital— <i>David E Thomas</i> .....	662
Evaluation of Pancreatic Exocrine Function and Intestinal Absorption With Radioactive Fat Preliminary Report— <i>Richard P Spencer Charles R Henkelmann and E Richard King</i> .....	668
Practical Allergy Program for Small Military Installations— <i>Merle S Scherr</i> .....	673
Potential Intelligence Testing A Case Study— <i>Alvin R Mohrer</i> .....	684
CLINICOPATHOLOGIC CONFERENCE	
U S Air Force Hospital Lackland Air Force Base Tex .....	693
SERVICE ARTICLES	
Effects of Sedation on Airborne Psychiatric Patients— <i>Franklin H Ernst Jr</i> .....	704
Preventive Dentistry in the U S Air Force— <i>Francis J Samaha</i> .....	708
Determining Potability of Water Supplies in the Field— <i>Harold J Fournelle</i> .....	713
Attitudes and Motivations of Test Pilots— <i>Laverne C Johnson</i> .....	718
CASE REPORTS	
Coarctation of the Aorta With Resistance to Blackout From Acceleration Forces— <i>Henry A Schlang Alon L Haslup and Rufus J Pearson Jr</i> .....	725
Anterior Pituitary Insufficiency and Diabetes Mellitus— <i>Charles B Moore</i> .....	730
Fatal Anaphylactic Reaction to Lidocaine— <i>Leslie M Morrissey</i> .....	740
Delayed Obstruction After First Stage Repair of Omphalocele— <i>James B Anderson and Richard P Gotchel</i> .....	745
DEPARTMENTS	
A Message From the A. M. A. ....	751
Distinguished Visitors Tour Army Hospital in Germany .....	754
Admiral Hagan Receives Georgetown University Award.....	756
Officers Certified by Specialty Boards.....	757

# TABLE OF CONTENTS—Continued

## DEPARTMENTS—Continued

A M A Military Medicine Section Meeting	759
Kimble Methodology Research Award for 1957	760
Deaths	761
Royal Air Force Officer Commended for Achievements in Aviation Medicine	762
Correspondence	764
Second European Congress of Aviation Medicine to be Held in September	764
BOOKS	
Review of Recent Books	765
New Books Received	778

## Foreword

The United States Armed Forces Medical Journal is the medium for disseminating information of administrative and professional interest to all medical personnel of the Department of Defense. The Assistant Secretary of Defense (Health and Medical) and the Surgeons General of the several services invite all medical officers, dental officers, Medical Service Corps officers, Nurse Corps officers and officers of the Veterinary Corps of the Armed Forces and the medical consultants of the Army, Navy and Air Force to submit manuscripts for publication in this Journal.

FRANK B. BERRY, M.D.  
Assistant Secretary of Defense (Health and Medical).

MAJOR GENERAL SILAS B. HAYS  
Surgeon General, United States Army

REAR ADMIRAL BARTHOLOMEW W. HOGAN  
Surgeon General, United States Navy

MAJOR GENERAL DAN C. OGLE  
Surgeon General, United States Air Force

# UNITED STATES ARMED FORCES MEDICAL JOURNAL

Volume VIII

May 1957

Number 5

## DOCTOR SAMUEL ADAMS

Revolutionary Army Surgeon and Orlarist

THOMAS M HUNTER P A D

**S**AM ADAMS, of Boston Tea Party fame, has long obscured another Sam Adams who, besides being almost as intimately connected with Revolutionary politics as his illustrious kin, was equally as dedicated to the struggling American medical science. This is Dr Samuel Adams (1745-1819) who was born in Connecticut but who lived most of his life in Massachusetts and Maine. His autographed manuscript diary, 1758-1819, in the Manuscript Division of the New York Public Library,\* is probably the most important and extensive medical diary extant of the 18th century and the beginning of the 19th in the United States. Adams started his diary with his *Puerile Diary* on 12 March 1758, at Killingly, Conn., at the age of 13 and ended it on 24 February 1819, at Bath, Maine, at the age of 74.

From History Department Pottsville Center Pennsylvania State University Pottsville Pa

Besides the Samuel Adams diary in the New York Public Library there are a few other known Adams papers. The Massachusetts Historical Society holds 12 items: 1774-1783 relating to inoculation hospitals; hospital conditions; lists of surgeons in military hospitals; prescriptions and provisions; camp news; and army life. These are mostly in the Artemas Ward, William Heath, J. C. Warren, and Henry Knox papers. The Boston Medical Library has one letter about Adams' daughter Clementine's death on 31 January 1815. The Manuscript Division of the Library of Congress has one item: a letter from Adams to a Mr. Hubbard dated 28 October 1782 concerning an order for vinegar for the hospitals at Boston and vicinity. The notebook *Lying in Cases* by S. A. is in the Historical Library of Maine. The Manuscript Division of the New York Public Library also has the diary of Adams' son John for the years 1797-1800-1805-1808. This consists mostly of entries about the weather, boating trips, and the theater of that day in Boston. The theater entries are interesting and informative about the plays then current in Boston. Like his father, John had a philosophical turn of mind and commented from time to time on the foibles of mankind and the futility of life.

At the end of 1768 Adams compiled a volume of extracts from his diaries of the first 10 years and destroyed the originals. Except for the years 1788 1803 1804 and half of 1789 however the daily entries in the series are present from 1768 to 1819. On almost every title page (fig 1) he professed to intend the diary only for his own use. He wrote about 1 000 000 words on more than 3 000 small octavo pages.\*

Nevertheless as extensive and as varied and colorful as the diary is it is apparently relatively little known. Quite possible however Adams painfully diminutive and sometimes obscure handwriting plus occasional code simple though it is would overawe even the most interested reader.

Samuel Adams' quest for professional growth in a then limited science happened to coincide with the troubled Revolutionary period. He started his life and career at the end of a transitional period in both the medical profession and colonial life. After a period in new England when the clergy ministered to the bodily as well as the spiritual needs of their parishioners prescribing mustard or hell fire as the case required,<sup>1</sup> and when frequently the most able medical men were newcomers from Europe rather than American born physicians were coming to regard their practice as a profession in itself. John Mitchell Royal Society William Douglass Leiden and Paris and Cadwallader Colden Edinburgh all European born had already distinguished themselves. Jared Eliot and Zabdiel Boyleston native-born were rising to prominence.<sup>2</sup>

The status of medicine in America in Adams' time was far below that of the science in Europe. The usual method of securing a medical education was by apprenticeship to a practicing physician. Boys from 14 to 17 might serve an apprenticeship of 4 to 7 years. Even those of good family had to do all kinds of manual work besides and as in Adams' case to tend the apothecary shop which was quite frequently an adjunct of the doctor's office. The centers of medical education were Leiden Paris and Edinburgh. The first American to take his medical degree in Europe was William Ball of South Carolina in 1734.<sup>3</sup> The medical department of the University of Pennsylvania was not founded until 1765 the Massachusetts Medical College (Harvard) in 1782.<sup>4</sup> Dissections were scarcely performed in the colonies before 1760 and then by stealth. There were few hospitals. There was the Pennsylvania Hospital founded in 1755 through the efforts of Dr Thomas Bond Sr and Benjamin Franklin and one

\* Decripted material and extracts which accompanied the Adams diary from the dealer who purchased by the New York Public Library.

Samuel Adams's  
Private  
Miscellaneous Diary  
For  
The Year Ann Dom. 1775  
part of which  
he was in the Town of Freetown  
and part in the  
Continental Army  
Before Boston  
as a Surgeon in  
Col Willows's Regt.  
Containing  
little else  
but remarks on  
and Memor<sup>a</sup> of Private  
Matters that concerned  
only himself

Figure 1 Title page diary 1775



in New York in 1771 destroyed by fire and rebuilt in 1774 but mostly used for barracks purposes. Obstetrics in which Adams took a keen interest did not become a part of the doctor's studies until after the middle of the century. Midwifery was completely a woman's domain.

While Samuel Adams did not embody the 17th and early 18th century concept of the doctor combining his practice with diverse other occupations at one time or another he was not only a country practitioner and Army surgeon but a teacher and tavern keeper as well. His commentaries are many, varied and rich. His record is extensive and diverse. In this respect, he deserves to be ranked with his more famous Adams kin whose diaries are so currently newsworthy.

In the common practice of the day Samuel Adams also sought to set down in his *Anatomy and Commonplace Book* all of the knowledge obtainable in his day. He was an avid collector as well of medical recipes. He seems in fact, to have recorded every conceivable kind of sense or nonsense. Even considering some of the fantastic compounds in use in his day and it must be remembered that the 16th century was no such an age of quackery as of reason. Adams must have had doubts as to the efficacy of some of the proposed remedies. Many of these miscellaneous and questionable and anything but scientific medical recipes were simply taken from an old *Anatomy and Commonplace Book* of Dr. David Sharrows. We must remember too that medical concepts of that day were based on a melange of ancient belief founded in magic and religion, hidebound tradition and doctrines which were formulated by authorities over the centuries and accepted more for that reason than through any scientific testing. A typical recipe is "Good dung mingled with vinegar and a little bran and applied as a plaister to a sore breast catcheth wonder fully all swellings thereof." We need not wonder so much at this however for though earlier William Penn certainly a highly intelligent man had included in his book of *Physick* a terrific concoction of butter, black snails, rosemary, lavender, elder new cow dung and new hen dung for bruises. A remedy for hiccupps was "Stop both your ears with your fingers and the hiccough will go away." For ringworms the prescription was "Take Vitriol all two drachms and dissolve it in a pint of clear water and with the water wash the hands it will cure ringworms better & scales in the same." To test fertility "Let a woman make water in a urinal that is cleann upon some barley corns and set the same in a cold place 8 days and if the [illegible] barley corns will grow again then the fault is not in the woman that she conceives not but in the man if otherwise than the fault is in her."

There was a liberal mixture of astrology also with this kind of medical practice "Let the physician take heed," was the warning, for example, "of his first visiting of the sick in the hour of Saturn and Mars if he come to him in the hour of Saturn either the sick will dye or else the physician shall have great labour doubts & [illegible] in the caring of him if in the hour of Mars there will be chidings and brawlings between him & the sick party & shall gain the hours of Jupiter & Venus are much praised the hours of the other planets are indifferant" One was to be particularly wary of Venus, however, when it came to receiving money, for, "He that receiveth a sum of money in the hour of Venus will spend the same with women in pleasure and wantonness"

Dr Adams also extracted from the manuscript of Dr Nathaniel Freeman, his mentor, who, in turn, had extracted it from an old manuscript of a Dr Cobbs, dated Barnstable, 4 December 1739, the following calendar of medical treatment

January—let not Blood nor physick this month unless some extraordinary occasion require it and beware of taking cold for Rheume and phlegms do much abound this month

February—if Necessity urge you may let Blood but be sparing in physick till March or April

March—now is the time to let Blood and Humours encrease

April—now purge and bleed the pores are yet open let Blood three months the moon being in Cancer or Taures it is Extreame perilous for the moon to be in ye same sign that rules the member in which the vein is opened Best to take purges when the moon is in Cancer Ointments or plaisters best applyed when the moon is in the same sign that rules the member to which it is applyed

May—(blank)

June—(blank)

July—abstain from physick unless Necessity urge

August—observe the same & letting blood

September—is a good time to use physick and phlebotomy as the opening a vein to discharge some of the blood

October—physick is to be used also this month

November—(blank)

December—the best physick this month is wholesome diet warm cloaths good cyder or beer and a carefull loving wife

In allusions to his love affairs and subsequent marriages sometimes by the repetition of certain initials in the lower right corner of his daily diary entry, or an occasional *scandale* in code Samuel Adams' diary is much like that of the famous Samuel Pepys. He appears to have married five times and to have had 15 children. He first married Deborah Larned on 21 March 1764. The first child died of a "Whooping cough" and Mrs. Adams died of "a consumption." Adams next married Abigail Jordan on 19 July 1773. She died on 8 July 1774, in childbirth. On 1 August 1776 he married Sally Preston who died on 24 September 1787 after an extended illness. The *Adams Genealogy* records Samuel Adams' marriage to Abigail Dodge on 29 June 1789. This is perhaps an error in the year, for there is no corresponding diary entry for that date. Abigail also died and Samuel last married Mary Ann Bent on 10 May 1815 at the age of 70 and had one daughter by her.

Samuel Adams was born on 26 January 1745 in Hillingly, Conn. to Michael and Sarah Shuttleworth Adams. His father was a direct descendant of the first Henry Adams who came to America in 1636. At the age of 17, Samuel Adams set out to be a foot soldier. He drew bounty on 11 May and joined Captain Spaulding's company of the regiment of Colonel Phineas Lyman at Plainfield on 19 May. Adams' regimental commander was then gaining a reputation during the Seven Years War, as the most able and trustworthy provincial general throughout the northern colonies and was even approved of by his British superiors at the same time that he was working to maintain the independence of his colony. Dressed in "the finest coat ever seen at New York" he sailed to join Albemarle in the expedition of provincial troops to Havana. The young impressionable Samuel Adams was no doubt greatly influenced in his political views by this able, young patriot. Physically however he suffered badly from the expedition and returned from it in very poor health. It was only during the following year that he recovered his health sufficiently to start studies at Hillingly with Dr. Nathaniel Freeman, another ardent patriot who as Lyman almost lost his life at the hands of Loyalists. Adams left home on 7 December and began his studies at Hillingly in March. Between 26 October and 10 November he studied under a Dr. Ironwood. Then on 12 January 1764, he began teaching school for a Mr. Turner.

On 3 September 1766, Adams went to Sandwich, Mass. located on Cape Cod Bay. Two days later he began the study of Physics under Dr. Freeman. He read a great deal from the works of the celebrated Hermann Boerhaave of Leyden, but he read not in the field of military medicine. There were few books on the subject then available in the colonies, except for the British

authority Sir John Pringle's *Observations on the Diseases of the Army* and the writings of Gerard Van Swieten. Van Swieten was a Viennese professor of surgery who wrote an important work on the hygiene of troops in camp<sup>12</sup> which, in the American edition, first appeared in Philadelphia in 1776, apparently for hasty use by the Revolutionary troops. Dr Freeman served as Adams' mentor and took him along when he visited his patients. Inasmuch as the duties of apothecary and physician were not divided until later decades,<sup>1</sup> the young medical student spent many hours in what appears to have been Dr Freeman's apothecary shop. Here he compounded the popular "potions," "infusions," and "electuaries" of the time.

Young Sam Adams was also being trained in pre Revolutionary politics as well as medicine. His mentor, Freeman, was later persuaded by his great uncle, James Otis, Sr., to read law. Freeman emerged as an able and prominent young patriot and became the moderator in Sandwich town meeting. He moulded patriotic sentiments and restrained the activities of the more spirited of his pro British neighbors.<sup>13</sup> Adams did not study law or become a magistrate, as Freeman, but he otherwise followed suit.

In April 1769, Samuel Adams began the practice of medicine at Truro, Mass., near Cape Cod. He resorted frequently to the common practice of blood letting, extracted teeth on many occasions, and endlessly prescribed cathartics such as sal ammoniac and diaphoretics for fever, elixirs such as antimony for female disorders, and varied tinctures and cordials for the stomach. A typical diary entry is, "September 12, 1769—Fair weather. Visited Mr. Knowles boy who had cut off a finger. Dressed it as a simple wound & extracted a tooth for Mr. J. Athens wife—gave Nitric & Calom to Mr. Nicholson little girl for worms."

Adams' interest in childbirth was lively, and he kept precise accounts. He sought constantly to facilitate rapid delivery. Part of his diary entry of 26 December 1771 is rather illegible, but it shows the care which Adams exercised and the skill which he must have had in child delivery.

was called about sun up to [illegible] in Falmouth in travail with her fifth child arrived about 10 O'clock found (by Mrs [illegible] the mid wife) that she was taken in Labour about [illegible] the membrane broke while she sat before the fire and the waters discharged her pains had been hard but not frequent all night—upon examining I found the os externum and internum fully dilated [illegible] finding the hand without the os internum and the funis umbilicus fallen down behind it the child's hand to the mother's right [illegible] I introduced my left hand the woman lying in a supine position under the arms to the child's [illegible] which with the hand I [illegible] as much as I could to the

[illegible] for the feet which not without difficulty I brought down to the os internum then introducing my other hand and around [illegible] the head—while with my left hand I gently pulled the feet and to my joy the arm extended into the [illegible] I then waited for a Labour pain which forced down the child with the hips without the os extermum & finding the pains did not force enough to bring the child without bringing down the arms I introduced my finger and brought them down over it [illegible] minding to turn the forehead into the hollow of the sacrum and putting my finger into the mouth brought out the head with a [illegible] it was a very large girl [illegible] woman comfortable—the operation lasted 40 minutes

In Ipswich between 1782 and 1796 Adams attended 485 women in childbirth and never once used the forceps, nor did he lose a single mother. From the time that he moved to Bath Maine in 1796 until his death in 1819 he attended an additional 1115 deliveries. He recorded all of these cases between 1782 and 1819 in his extensive notebook *Lying in Cases by S. A.*,\*—briefly usually, but always plainly. He was ready to go almost anywhere. There were instances of births at the Isles of Shoals off Ports mouth and Wood Island at the mouth of the Merrimack.

Sometimes he was called so late that the patient was close to being in extremis. He reported an earlier case, on 27 May 1772 of an expectant mother who had been in strong convulsions for some time and who died after Adams had delivered a live baby. When first saw her every symptom seemed to indicate that she was

ying. He supposed the woman to be about seven months gone with child. "Let her bleed," he says "ordered a clyster—gave nervous medicine and an opiate but gave no relief—introduced hand in uterus. Shoved up the child's head brought down the feet and delivered with care a fine girl alive."

Adams was called upon for his obstetrical services by people far and wide. He attended the wives of Dr. Nathaniel Weld and Dr. Timothy Waldron of Bath. There are few other traces in Maine medical history to be found of these cases. Little otherwise is known of some cases, however, for according to his *Lying in Cases*, Adams kept a separate account in great detail of his most difficult obstetrical cases but though the search has been intensive this second notebook has never been found. In the first notebook he told of his meeting his own fourth wife who had brought into the world 14 children. Of his own children he never mentioned more than eight from four wives. In his practice twins were not uncommon. Occasionally labor was tedious but usually

In the Historical Library of the U. S. Army Medical Department, Washington, D. C. is a copy of the original manuscript of this paper, which was written by Dr. Adams in 1819. It is a very interesting and valuable document, and is a good example of the work of a pioneer obstetrician. The paper is written in Adams' own hand, and is a very good example of his style of writing. It is a very interesting and valuable document, and is a good example of the work of a pioneer obstetrician. The paper is written in Adams' own hand, and is a very good example of his style of writing. It is a very interesting and valuable document, and is a good example of the work of a pioneer obstetrician.

it was rapid. Although often short, the umbilical cord was more often very long. Frequently, and in curious manner, it was convoluted around the neck, body, and arms. Adams noted the cases of two children born with six fingers and toes on each hand and foot. On others, there were a few instances of supernumerary fingers. Infants weighed from three pounds to eleven and three quarters. In a case of eclampsia with convulsions, Adams noted that, "All the women in the room and house were frightened at nothing," but that he finally brought the patient around all right by giving opium abundantly. Many times at the end of a delivery, Adams would add "Went home at last, mother and baby doing well." He did most of the midwifery in Bnth for many years. He had one rival, an Old Granny Lombard, who for a silver cart wheel (silver dollar) would bring an infant into the world. She had enough common sense, though, to know just when to get her dollar, then to give Dr. Adams a chance to earn his five and travel costs and to finish the case properly. On more than one occasion, Adams had incognito patients as private boarders in his home. One time, he carried the child in the night to elsewhere in the community to be suckled for five shillings per week.

By 1770, Adams was becoming involved more deeply in pro Revolutionary politics. He was a dedicated patriot. While at Truro, he was quite active in controlling the few Tories of the neighborhood. He recorded the Boston "Massacre" on 16 March 1770 as follows: "Fair Dressed foot wound Received News papers on account of the unhappy affair with the soldiers. Vid B Gazette March 12, 1770." He attended annual commemorative services for this occasion in later years. On 1 June 1774, he bitterly described the blockade of Boston Harbor (fig. 2).

On 2 July, Adams' first son was born but died on the last day of the month. He described his wife's sickness and death with agonizing detail from 3-8 July.

By fall, stirring meetings were being held about Tea and Tories, and Adams was sometimes the clerk. On 22 October 1774, Adams recorded "S. Cloudy somewhat. Went to Captain Jonathan [illegible] Freeman's & to sundry other places among the shops. Died this morning Mr. William Mollineaux greatly lamented by the Whigs but to the joy of the Tories." He attended the Mollineaux funeral on 24 October and the next day visited Faneuil Hall for a town meeting. He saw General Gage and noted that, "Gen. Gage has nothing majestic or thinking in his person. His person does not bespeak him capable of the great business he is bent upon."

Adams' mentor, Dr. Freeman, now suggested that Adams apply for a warrant of surgeon. In the spring of 1775, Adams visited the army at Cambridge and saw General Washington, with whom he

June

1774

1<sup>st</sup> of June - 4<sup>th</sup> of July - 1774 - "Paine informed from her  
 11<sup>th</sup> Paine's quoted coat of arms -  
 This Day was put in execution - the unjust &  
 oppressive act of Parliament for blocking up  
 the Harbour of Boston - behold in this act an enormous  
 stretch of the arbitrary power by which the property of the brave & worthy  
 Bostonians are wrested from them - and we have here the determination of Ad-  
 ministrators to enslave America. Will not the brave Patriots of Farmington  
 be justified by all well wishers to their country in resolving that the Parli-  
 ment of Great Britain was instigated by the Devil to pass the S. Act & may  
 we not add that they have thereby proved themselves to be of their Father  
 inveterate & infernal enemy to his native country that could with the  
 "Abridgement of English Liberties & be highly desirous the bitterest cups of  
 all succeeding generations come upon us -  
 as though he meant this heavy calamity to come -  
 upon us - - -

Figure 2 This day was put in execution the unjust & oppressive act of Parli-  
 ment for blocking up the Harbour of Boston - behold in this act an enormous  
 stretch of the arbitrary power by which the property of the brave & worthy  
 Bostonians are wrested from them - we have here the determination of Ad-  
 ministrators to enslave America. Will not the brave Patriots of Farmington  
 be justified by all well wishers to their country in resolving that the Parli-  
 ment of Great Britain was instigated by the Devil to pass the S. Act & may  
 we not add that they have thereby proved themselves to be of their Father  
 inveterate & infernal enemy to his native country that could with the  
 "Abridgement of English Liberties & be highly desirous the bitterest cups of  
 all succeeding generations come upon us

was frequently in company Inter He recorded the battle of Bunker Hill on 17 June On 7 July, a board of surgeons appointed by Congress and consisting of Drs Benjamin Church, John Taylor, David Jones, William Whiting, William Bayless, Jeromiah Hall, William Dinsmore, and Samuel Holten\* examined Adams and gave him a warrant of surgeon the following day Adams could be called "Mister" or "Doctor," but there was no rank with his commission. He was assigned to the 18th Regiment of Continental Infantry<sup>11</sup> under Colonel Edmund Phinney at Roxbury He served from 1 January to 31 December 1776 \*\*

The news of the evacuation of Boston by the British army was music to Adams' ears On 17 March 1776, he wrote

The British army in Boston under General Howe consisting of upward of 7000 men after suffering an ignominious blockade for many months past this day disgracefully quitted their Strong holds in Boston & Charlestown and precipately fled from before the Army of the United Colonies & took refuge aboard their Ships—a detachment of our Army under Genl Putnam took possession of the Town of Boston with all its important Posts in the name of ye 13 United Colonies of North America—another detachment of Bunker Hill

In April, the smallpox broke out in the army and became epidemic On 17 July 1776, Adams wrote, "Came into town in the morning—found the town under inoculation about 8000 persons having received the small pox in that way" Even several months previously he had mentioned sending various men to the small pox hospital at Howell's point He also recorded a number of private inoculations, some in code, as 10 April 1776 "D4ct SpglO 1384156H2d pg3vite6y f49 thz Sml86 p4x [Doctor Spiro inoculated privately for the small pox]" The descriptive material with the Adams diary states that Adams confirms the report which was circulated that the British had sent an infected Indian to Boston to spread the smallpox, but, after an exhaustive search, I have not been able to find such a specific diary entry Assuming that such a report was circulated, Adams possibly gives some credence to the report when he says on 27 July, "An Indian fellow died with small pox" Whatever may be the facts of the story about the infected Indian, smallpox was a scourge to the health

---

Adams just mentions Drs Church Taylor Jones and Holten and the committee appointed by Congress The complete names of these doctors and those of the committee members have been taken from Duncan's Appendix B List of Medical Men Who Took a Part in the American Revolution pp 379 414 and p 40 for the examining committee

\*A diary title page of Adams' mentions service under a Colonel Fellows before Boston in 1775 This is not listed in the Surgeon General's Records<sup>11</sup> as official service and must have been before Adams was given a warrant of surgeon by Congress



and morale of the army. It was even more destructive than British bullets during the first two years of the war.<sup>12</sup> It has been said however that there was little suffering at Boston, this in spite of the fact that Dr. John Morgan was opposed to inoculation.<sup>13</sup> The little suffering was probably due, therefore, to the systematic efforts of medical men such as Adams who believed that inoculation, "heroic" weapon though it was, would prove to be effective. During the summer of 1776, it was generally being applied. Washington is said to have been inoculated.<sup>14</sup> Adams not only mentions the inoculation hospitals in his diary, but there are two letters in the Dr. Samuel Adams papers of the Massachusetts Historical Society which relate to the establishing of inoculation hospitals.

From these concerns, Adams now momentarily turned to marry again. He married Sally Preston on 1 August, but he was soon back with the army. Seven days later he marched with his regiment to Ticonderoga. Supplies were frequently short, but, on 7 September, they finally reached the fort. Six days later he reported the battle on Lake Champlain. He was kept busy with the sick and the wounded from the battle of 13 October. He recorded in his diary the loss of the Royal Savage. On 23 November he set out for Lake George.

Adams participated both in the campaigns in New York and New Jersey and in December 1776 he transported the sick to Albany and received a leave of absence. Everywhere he went he noted the customs and habits of the people. He was no doubt already familiar with the beadle in early churches who carried the collection bag on a large pole, but when he visited the Dutch church at Albany and saw the collection bag on a stick with bells, he thought that it was worth recording in his diary.

From time to time Adams went on leave from the army to visit his family or to move their residence. Wherever he was, though he showed his endless curiosity. On 9 January he wrote "some what cloudy but not so as to hinder seeing the Eclipse of the Sun." Between 15 February 1777 he moved his residence from Truro to Dorchester, south of Boston.

During 1778 Adams was frequently on the move. He took the time however on 3 January 1778 to dissect a dog, but he tells nothing more of it than just that. On 17 March 1778 he recorded "Cold with some squall of snow. Dined at his Excellency Gen. Washington's headquarters Middle Brooke." On 14 May he joined the 3d Continental Artillery Regiment<sup>15</sup> under the command of Colonel John Crane. The colorful Crane, one of the Sons of Liberty, had also been one of the Boston Tea Party Indians. While down in the hold of one of the ships he had been knocked senseless by a chest of tea. His companions believing him

dead, had concolod him under a pile of shavings in a nearby carpenter shop Crno had a sturdy constitution, though, and rocovered On 1 January 1777, he had taken command of the 3d Artillery Regiment which served ns a detachment under Sullivan in the Rhode Island campaign Ho received honorable mention under Gntes nt Saratoga and in the defense of Red Bank.

In June, Adams journeyed into the Pennsylvannin German country He visited Bethlehem and wrote in his diary about the customs and habits of the Moravians He was especially impressed by their quiet and civil manners, their ingenuity, industriousness, and thrift

This was just an interlude, however, because of the rapid acceleration of military movements On 5 June Adams marched to Morristown On 17 June he wrote, "Air very hot Crossed Sullivan's Bridge over Schuylkill and got into camp at Valley Forge about 10 o'clock Dined at Gen'l Knox's " Ho reported the engagement at Monmouth and had the care of the sick at English town "Our army," he says on 29 June, "after burying the Dead, taking care of the wounded we left nt night marched back to Englishtown I went over the field of battle A shocking sight!" On 13 July he assisted Dr Charles McKnight,\* a New York surgeon, in snwing off part of the fibula of Captain Thomas Arnold's leg and later helped Dr McKnight to amputate it "The ball," he said, "was ledged in the center of the tibia, which bone was fractured badly " All compound fractures at that time, except those of the hip joint, called for amputation, and Adams concluded that there was no possibility of saving the leg Ho thought, in fact, it a pity that this had not been recognized and the leg amputated before

During 1779, there was a period of relative quiet and inactivity in Adam's service When he was not attending the sick, he spent much time in reading in bed, which was the warmest spot in a room without a fire Ho played a lot of backgammon which he called the "ministerial game of Back gammon" On 6 August he visited the artillery and found them afflicted with nothing more serious than bugs The report of this, which soon made the rounds of the camp, and which Adams recorded in his diary in code, provided much merriment to a dull camp life

The years of 1779 1780 were bitter, frustrating ones for Adams He no longer wrote of "the brave and worthy Bostonians " He now referred to them as "smug Bostonians " As many army men,

---

Adams only mentions a Dr McKnight This could only have been Dr Charles McKnight because he was the only medical man by that name in the American Revolution

Adams had received little or no pay He engaged in constant wrangling with the legislature for back pay The currency was depreciated Prices were skyrocketing A pound of butter was a dollar A hat sold for as much as \$1 000 and Adams paid \$250 00 per week for board for himself and his family Adams was progressively becoming disillusioned

On 9 April 1780 he received a leave of 60 days He was in desperate financial circumstances By 24 April 1780 Adams let himself go in a tirade against his previously "brave and worthy Bostonians" He wrote in his diary 24 April 1780 Went to Boston with Mrs A—went to a great number of places on business—the currency depreciated to almost nothing—it seems to me the people are all mad—would to God they were all obliged to serve in the army as private soldiers one winter and farc as the troops did last winter in West Point—it might I think bring them to reason "Two days later, he continued This day by order of Congress observed as a day of fasting and prayer throughout the united States—could not attend Meeting for want of cloaths to appear decent—brought to this in the service of my country!"

Adams' bad temper about the especially seamy sides of the war was temporarily mollified during 1780 and 1781 possibly partly because of his being made a hospital physician and surgeon on 6 October 1780 and partly because of his intimacy and conviviality with Washington Lafayette and other high ranking persons On 26 December 1780 he wrote "Dined at his Excellency Genl Washington with Genl Howe, Col Scherrel, Doct Cochran—good dinner—excellent glass of wine—very agreeable company—spent evening in reading in the Boston Chronicle for 1767" Yet the instinctive bitterness remained and soon cropped up again On 1 January 1781 General Knox entertained all officers of the Brigade at dinner "We were a set of poor miserable boys without a single shilling in our pockets—consider this ye money catchers at home and think what you deserve for your sordid avarice and your treatment of your army"

By 5 February, Adams' drooping spirits revived again On that day he wrote "Cleared away last night—fair day—much warmer than yesterday—walked to the Park exceeding bad walking visited my Patients all doing cleverly—Dined at Head Quarters New Windsor—Marquis de La Fayette General Clinton also there—exceeding good dinner—Wino excellent' enjoyed myself well—Miss Hamilton present pretty little Brunette much fine in her eye "This camaraderie had its effect While he deplored the general attitude of the public Adams held his respect for the leaders of the army He later named a son for Henry Knox, general of the artillery command under which he served During

August 1781, he was received again by General Knox "Waited on Genl Knox," he wrote, "was received cordially as I could wish for"

Disillusioned as he was, Adams did not resort to corresponding with the enemy as Benedict Arnold. Adams rather fully relates the news of Arnold's treason in 1780, and he was completely unable to understand how Arnold, after having served his country with a bravery that bordered on madness, could now turn to the enemy. He concluded that "an incurable thirst for gold" was the only thing that "would [have] induce[d] him to overturn that cause in which he had fought so bravely!"

Adams had been granted a 70 day leave of absence on 21 February 1781. There was a growing doubt in his mind that he should remain in the army. He took to lobbying while attempting to get his back pay from the government. Apparently it was necessary to get a petition through the legislative houses before payment could be made. Adams' petition passed one house, but failed in the other. He was enraged to the breaking point and wrote in his diary, "I had the satisfaction to speak my mind freely on the affair and among many other things I told several of the Senators before a number of witnesses on the floor of the State House that what they had done was worse than High way Robbery—which they swallowed tolerably easy—oh! the Brutes!—stupid low liv'd Devils!" By August, Adams was thoroughly discontented and tired of war. Between 22-27 August, he was at Verplanck's Point and West Point. On 4 September, he noted in his diary that he was even unable to pay the postage on a letter from his wife.

The war news gave a lift now, however, to Adams' shattered morals. On 24 September 1781, he recorded, "A report prevailed yesterday and this day that in an action between the British and French fleets off the Chesapeake, the latter were completely victorious, that the British had two ships fired three run aground and four taken—that this has caused the greatest consternation in New York, and that they are preparing to evacuate it—a glorious affair. God grant it may prove true and that this campaign may be the last of the war." "The tide of victory was turning quickly now, and, on 28 October Adams wrote, "Authentic intelligence arrived here this evening that on the 19th inst. two of the enemies redoubts at York Town were stormed one by the French the other by the Americans and carried with little loss, that hostilities ceased on the 19th and on the morning of the 19th Lord Cornwallis marched out with his army when 3400 reg. troops grounded their arms, 2000 more were sick & wounded in the hospitals."

Shortly thereafter, Adams became ill. He secured a leave of absence from 6 December to early April and returned to his family.

on 15 December. He set up housekeeping in Boston, undoubtedly with a view to keeping an eye further on the legislature. On 11 July 1783 he resigned his commission.

During this time besides trying desperately to get his back pay, Adams looked about for a town in which to resume private practice. A Dr Manning, probably John Manning, an Army surgeon of Massachusetts proposed a partnership in Boston to Adams. Adams rejected it. Instead, he removed to Ipswich, in northeastern Massachusetts to continue private practice.

Samuel Adams' diverse interests never failed him. He entertained President Washington on his passage through Ipswich on 30 October 1769. On 20 December he was in Boston and went aboard the new India ship of 800 tons built at Braintree for Shaw and Randall to be used in the Canton trade.

The immediate years which followed were seemingly rather quiet ones so far as the practice of medicine was concerned and Adams turned to tavern keeping for several years. In 1792, he leased Treadwell's tavern house for three years from 1 May at 45 pounds per year. On 19 April, he also agreed to attend the poor of the town for 25 pounds and 15 shillings. He commenced tavern keeping on 10 May, but it does not appear to have been rewarding in any particular sense unless it was the satisfaction which Adams undoubtedly received from the atmosphere of a public house.

At some point during these years Adams decided to journey to Maine with a view to moving there. General Knox, Colonel Plummer and other military officers of his acquaintance seem to have urged and advised him to do so. They knew that he was unusually capable and might find more opportunities for advancement there. It is also possible that Mrs. Adams helped to prompt him inasmuch as she was from Portland. Between 29 February and 1 May 1796 he journeyed to Maine and rented a house at Bath for \$40 per year. He sailed with his family for Bath on 6 July. In 1799 he was said to be living on Washington Street.

Samuel Adams spent the rest of his life in country medical practice. He was the only physician in Bath. The next physician Dr John Stockbridge did not settle in Bath until 1813.<sup>1</sup> Adams wrote in his diary about family life, current events, social affairs, his medical practice, work in the kitchen garden, now his main hobby and his fondest and, finally, the weather. His

Letter from Mr. Henry W. Owen to the author of *The Edward Clarence Plummer History of Bath, Maine*, 14 May 18 1956. Mr. Owen says Dr. Adams resided at Levi P. Lemont's residence on Washington Street in 1799.

lifelong interest. On 7 January 1800, he took part in a procession in memory of George Washington. He was one of the contributors to the fund for the purchase by the North Church in 1803 of the Paul Revere bell. The bell now hangs in the belfry of the Bath City Hall. On 2 February 1804, he was made a fellow of the Massachusetts Medical Society. He was active in Masonic affairs, being a charter member of the Solar Masons, F & A M, founded in Bath in 1804. In 1805-1806, he was its second master, succeeding General William "Sultan" King, a wealthy shipowner and the first governor of Maine. Although the records are fragmentary, Adams was paid by the town of Bath in 1811-1812 to be in attendance upon the poor. He was also one of several gentlemen who were incorporated by the General Court under the title of Trustees of Bath Academy. This was the Female Academy which later became Bath High School.

Age was no barrier to Adams' interest in portraiture and family life. After the loss of his fourth wife and children Albert and Clementine during these years, at the age of 70, he married Mary Ann Bent by whom he had a daughter Julia Ann. On 21 November 1816, he had his likeness made by Benjamin Greenleaf,\* the popular but rather peculiar portrait painter, educator, and author of important mathematical textbooks. Greenleaf lived with the Adams family. Adams wrote in his diary, "I had my likeness taken by a Mr Greenleaf who came to our house on Monday last." Greenleaf, as was the custom of the times among artists, was no doubt off on a rambling itinerary of portrait painting. Just what he received as remuneration for his portrait of Samuel Adams is hard to say, but Adams was determined to get his board money. He wrote on 14 December, "Mr B Greenleaf board settled up to this day—balance of all accounts Board begins anew from this morning."

Samuel Adams' diary entries were gradually tapering off. In October 1817, he visited friends and relatives in Boston, Andover, and Ipswich. His daughter Julia Ann was born on 13 June 1818. On 25 February 1819, he characteristically but symbolically wrote the last entry in his diary. "Cloudy," he wrote. Nine days later, Dr Samuel Adams was dead.

\* See footnote on p. 640.

This Greenleaf portrait may no longer be in existence. It is not listed with known Greenleaf portraits (reference 1440 *Early American Portrait Artists 1663-1860*, preliminary volume compiled by The New Jersey Historical Records Survey Project, CPA, Newark, N. J. The Historical Records Survey, 1940) and an extensive search by the author has produced no lead as to its existence or location. It may have been lost by being broken. This is what happened in at least one known instance and is unfortunate because Greenleaf was an accomplished limner on glass. He is said to have lived in Phippsburg down the river from Bath, Maine, 1810-1817 according to a letter from Carl N. Schmalz, Jr., Curator of Bowdoin College Museum of Fine Arts, July 10, 1956.

Samuel Adams was a physician when earnest efforts were being made to strengthen the scientific basis of medicine. He is said to have been "the most intelligent and successful practitioner in the state of Maine" in his day. This is probably true. He was undoubtedly highly regarded in Massachusetts as well. It was not an easy time, however, in which to grow professionally. Beneath the troubled political events of the Revolutionary era, America was experiencing a cultural undercurrent. It no doubt even helped to mould the political events, but political nationalism took precedence over cultural nationalism. The physician nevertheless was emerging as a professional man, and his social standing in the community depended largely upon his medical success. In his time and place, Samuel Adams was a success.

The era of Samuel Adams was a transitional one, and much yet remains to be known about it. Samuel Adams did not achieve eminence as say John Morgan, Edward Shippen, or Benjamin Rush of the Revolutionary generation. He was in many ways though more fortunate than they. He did not become involved in the violent medico-political conflicts of the day as they. Adams' diary simply reveals the life and work of a physician of varied interests and inquiring mind who tried especially to improve obstetric procedures before there was even such a phase of medical study. As an Army surgeon, he gave some of the best years of his life to the service of his country. As a hospital surgeon, he sought to improve hospital facilities and administration. It was a day when medical men had too few facts with which to work. They tried nevertheless to apply logic to what facts they did have. Tentative as much of it was, an increasing pursuit of science was going on in America. This growing interest in science and its influence upon Revolutionary America and subsequent history is only now coming to be known. Samuel Adams belongs to that formative period in American history.

#### REFERENCES

- 1 Adams, J. T. *Provincial Society 1690-1763* (History of American Life Vol. 3) Macmillan Co. New York, N. Y. 1927 pp. 60, 62, 124, 125, 269, 126.
- 2 *New England Genealogical and Historical Register* Vol. XLI pp. 391, 392.
- 3 List prepared by Dr. James Couper, New Castle, Delaware, chairman of committee appointed by the National Medical Convention to report on medical education. First published in the *American Journal of Medical Science*. Reprinted in *The Western Lancet* 6: 57-58 May-Dec. 1847.
- 4 Duncan, L. C. *Medical Men in the American Revolution 1773-1783*. Medical Field Service School, Carlisle, Pa. 1931 pp. 8, 19, 16.
- 5 Spaulding, J. A. *Maine Physicians of 1820: A Record of the Members of the Massachusetts Medical Society Practicing in the District of Maine at the Date of Separation*, 1928 pp. 10, 11, 23.
- 6 Adams, A. N. (editor). *A Genealogical History of Henry Adams and His Descendants*. Tuttle Co. Rutland, Vt. 1898 pp. 320, 328.
- 7 *Dictionary of American Biography* Vol. I p. 72. Vol. XII pp. 12, 13. Vol. XI p. 517. Vol. IV pp. 505, 506. Vol. V pp. 405, 406. Vol. VII p. 581.

- 8 Historic Adams papers a first view *Life* 41 66-76 July 2 1956
  - 9 Thacher J *American Medical Biography* Vol II pp 244 246 1828
  - 10 Van Swieten G kurze Beschreibung und Heilungsart der Krankheiten welche am oftesten in dem Feldlager beobachtet werden (A Short Narrative and Treatment of the Illnesses which were most frequently observed in the Camp) C Wico Prag u Triest 1758 Philadelphia 1776 and Boston 1777
  - 11 Surgeon General's Records "List of Officers of the Medical Department 1775 1892 Record Group 112 Entry 84 National Archives
  - 12 Gibsoo J E Smallpox and the American Revolution *General Magazine and Historical Chronicle* 51(No 1) 55 Autumn 1948
  - 13 Heitman F B *A Historical Register of the Officers of the Continental Army During the War of the Revolution, 1775 1783* The Rate Book Sho Publishing Co 1914 p 76
  - 14 Oweo H W Jr *The Edward Clarence Plumer History of Bath Maine* Times Co Bath Maine 1936
  - 15 Reed P M *History of Bath and Environs* (Portland 1894) -- 187-184
-



# THE ROENTGEN DEMONSTRATION OF DUODENAL ULCER

EDWARD R. HEITZMAN, Jr. *Captain USAF (MC)*

**R**ECENT reviews concerning the military effectiveness of ulcer patients made by Palmer, Sullivan, and Hamilton<sup>1</sup> indicate that the problem of duodenal ulcer in the armed services is one of greatest importance. The age incidence of duodenal ulcer and the fact that it is four times as common among males as among females predisposes military populations to this disease. Sherman's<sup>2</sup> recent article concisely summarizes some of the important points that indicate the magnitude of the ulcer problem. He emphasized the high incidence of ulcer and the fact that this incidence is increasing. He also pointed out the extensive morbidity and the significant mortality arising from this disease. The number of man hours lost due to ulcer is overwhelming. The possibility of sudden perforation, hemorrhage, et cetera, is always present and among key personnel particularly those who fly may result in tragic accidents.

In many instances the diagnosis of duodenal ulcer can be made with assurance from clinical symptoms and findings alone. Many times, however, the presenting complaints are bizarre. Several other conditions may simulate the ulcer syndrome closely. Indeed, some of those individuals with the most typical ulcer syndrome subsequently are shown to be suffering from a condition other than ulcer. Many times the distinction between gastric ulcer and duodenal ulcer cannot be made clinically, yet this is an absolute necessity because the course of each disease is so different.

Most of the upper gastro-intestinal series on military personnel are performed with the differential diagnosis of ulcer in mind. It therefore, seems obvious that the examination of the upper gastrointestinal tract for ulcer must be regarded as an examination of utmost importance. Hodges has emphasized this by stating "Haphazard superficial or careless examination of patients has no place in the search for these lesions and can do much harm by providing erroneous opinions in whichever direction the error is made. An incorrect diagnosis of duodenal ulcer may sentence a patient to . . .

From U S Air Force Hospital Barksdale A F Base La Dr Heitzman is now  
at Veterans Administration Hospital Irving Avenue at University Place Syracuse  
10 NY

prolonged period of unnecessary irritation and restricted opportunity in life. Failure to recognize the lesion when present provokes a false sense of security which may well be fully interpreted by the totally unexpected development of one or another of the common and frequently tragic complications of the disease. Actually, an expert examination is less than valuable, it is an unnecessary imposition upon trusting patients.<sup>21</sup>

Nevertheless, despite the most skilled examination of the upper gastro-intestinal tract, it is stated by many authors that evidence of duodenal ulcer can be found in only 50 to 60 per cent of patients with an actual ulcer. Bockus<sup>2</sup> believes that, if one included all types of duodenal deformities and mucosal defects, approximately 90 per cent of ulcers would be revealed by roentgenographic examination. It seems worthwhile therefore to review the primary and secondary findings in duodenal ulcer and to emphasize certain techniques by which ulcer may be diagnosed with greater accuracy. In this review, pyloric ulcer and post-bulbar ulcer are excluded as constituting special problems. However, most of the subsequent statements apply equally well to these lesions.

It is hoped that these points will be of some interest to those doing radiologic work in the armed services where, due to the relative shortage of radiologists, some roentgenographic examinations must, of necessity, be done by general medical officers with a limited background in radiologic technique and experience.

### ROENTGEN SIGNS OF DUODENAL ULCER

Correlation of radiographic findings in duodenal ulcer with gross and microscopic pathologic findings is difficult to obtain because many patients with duodenal ulcer are never operated on. In fact, many of the patients operated on have subtotal gastrectomy performed without excision of the duodenal ulcer. In many cases technical difficulties preclude an accurate visual examination of the region of the duodenal bulb at operation. Nevertheless, over the years certain types of roentgenologic findings have become relatively well standardized and can be relied on with considerable certainty.<sup>22-24</sup>

It should be emphasized that active duodenal ulcer can be diagnosed with 100 per cent certainty only when the actual crater is demonstrated. This is the only sign pathognomonic of ulcer. It has been stated that an attempt should be made to visualize the ulcer crater *en face* and in profile on every examination (fig. 1). Frequently this is not possible, and a clear cut demonstration of the crater in either of these two projections is sufficient to make a definite diagnosis.

When an actual crater cannot be demonstrated, the diagnosis of an active duodenal ulcer can often be made accurately on the basis of

basis of so-called secondary signs. These secondary signs may be grouped into findings indicative of consistent bulb deformity and findings indicative of bulb irritability or spasm, bulb tenderness and secondary gastric changes.

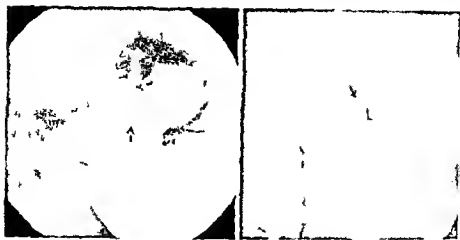
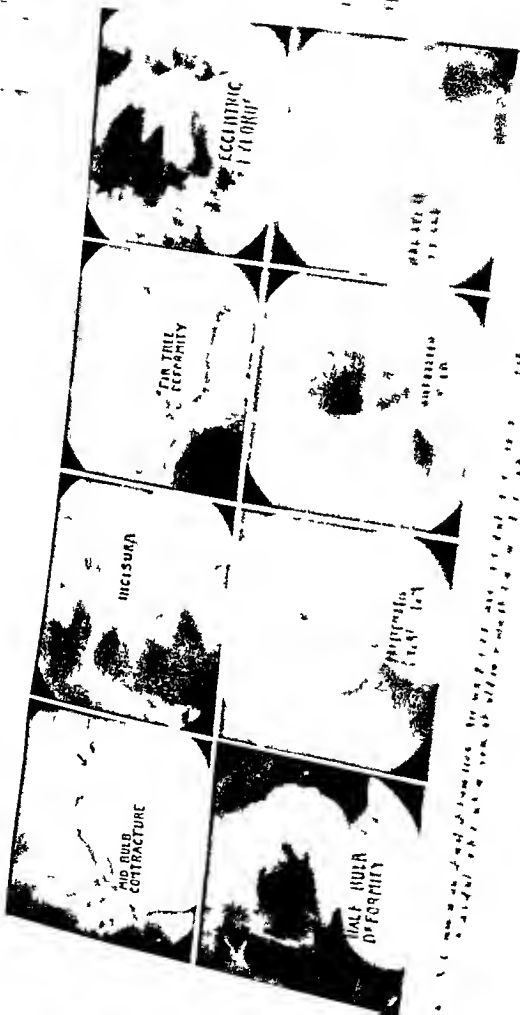


Figure 1 Ulcer crater or niche on the anterior wall seen en face (left) and in profile (right).

Deformities of the duodenal bulb may take many forms. Among these are the so-called half bulb deformity, fir tree deformity and the mid bulb constriction referred to as the clover leaf or necktie deformity. Other significant deformities are the incisura, radiating folds, microbulbus, prestenotic diverticulum, eccentric pylorus, et cetera (fig. 2). These deformities appear to be the result of mucosal edema coupled with a certain amount of muscular spasm within the duodenal cap. Fibrosis may play a role in lesions of longer standing, and some of the more chronic deformities may be due to periduodenal adhesions. Under certain circumstances any of these findings may be present in a chronically scarred bulb in which no active ulceration is present. However, any of the bulb deformities should, when found, indicate a very careful examination in a search for the actual ulcer crater. If a crater cannot be demonstrated, the evaluation of irritability or spasm of the duodenal bulb becomes of importance in indicating whether an active inflammatory process is present.

Evidence of spasm or irritability will be noted only on careful and relatively prolonged visualization of the duodenal bulb. If the duodenal bulb never fills out well during the period of observation and passes barium through at a very rapid rate, some spasm may be inferred, although some exceptions to this statement will be encountered. Spasm of the pylorus is a frequently encountered problem and is not necessarily indicative of a pathologic condition in the duodenum. Various maneuvers may be carried out in order to relieve the pylorospasm. The greatest success in over

May 1957



coming it has resulted from placing the patient on the right side for a few moments. Occasionally it is necessary to discontinue the examination for a period of several minutes. When pylorospasm is present duodenal ulcer should be suspected. Bockus stated that actual hypertrophy of pyloric muscle is seen in duodenal ulcer. Without other corroborative evidence, however, pylorospasm is a nondiagnostic finding because it can be found in many subjects without organic gastro-intestinal lesions. Certain drugs have sometimes been administered to overcome pylorospasm but this is very rarely necessary.

Careful palpation should always be carried out in an effort to elicit consistent tenderness in the region of the duodenal cap. Active ulceration within the duodenal cap may be suspected if consistent tenderness in the region of the bulb is elicited during palpation in various positions. Certain patients may fail to admit pain even when it is present because they realize that loss of job opportunity or other adverse circumstances may result from the establishment of an ulcer diagnosis. This is particularly true among those who fly since the establishment of a definite ulcer diagnosis may result in the loss of flying status. However even consistent tenderness is of little significance unless correlated with other roentgenographic evidence.

The gastric signs of duodenal ulcer have been referred to by many authors. Essentially these are hyperperistalsis and prominent mucosal pattern with or without gastric retention. The presence of retained food or fluid within the stomach accompanied by some gastric dilatation is indicative of outlet obstruction of the stomach which in the absence of an antral lesion is statistically most likely to be due to a partially obstructing duodenal ulcer.

It is clear that evaluation of these so-called secondary signs of duodenal ulcer requires considerable judgment and experience and is fraught with pitfalls. It is the proper assessment of these signs, however, which must be sought in an effort to increase accuracy in the roentgenographic demonstration of this disease.

It is always unwise to make a definitive diagnosis on the basis of physical findings without obtaining a detailed history. Similarly, the radiologist should be fully informed of the patient's history prior to the roentgenographic examination. An adequate history should accompany the request for the examination and the radiologist should interrogate the patient in an effort to obtain correlation of clinical evidence and roentgenographic findings which will lead to the highest degree of diagnostic accuracy.

There is a condition which is perhaps overdiagnosed and controversial but has been definitely shown by Kirklin to be a clinical and pathologic entity. We refer to duodenitis of the duo-

denal bulb. This requires special consideration. It is not possible to give an absolute roentgenographic diagnosis of duodenitis without perfectly typical findings correlated with typical symptoms and clinical findings. This is particularly true since normal variations in the mucosal pattern of the duodenal cap may in certain extreme instances simulate the pattern seen in duodenitis. These findings are usually described as a small bulb presenting a reticular pattern of the so called cobblestone type. This pattern is not readily obliterated by pressure, as is usually the case in normal variation of mucosal pattern. These findings are associated with spasm of the duodenal bulb and a rapid passage of barium into the second portion of the duodenum. The return of the bulb mucosa to normal pattern after treatment confirms the original diagnosis, especially if correlated with improvement in symptoms (fig. 3).

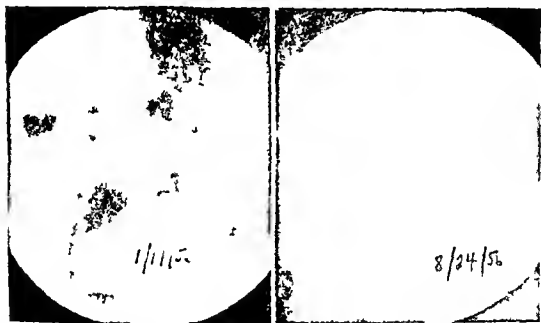


Figure 3 Duodenitis. Left Contracted bulb with cobblestone mucosal pattern despite pressure over bulb. Bulb was spastic and tender at fluoroscopy. Right Normal bulb shown after medical regimen patient asymptomatic.

#### TECHNIQUES OF EXAMINATION

Techniques for the performance of gastro intestinal series are as many and varied as the preferences of examiners. It is the intention here only to emphasize certain maneuvers which may assist in the demonstration of duodenal disease, particularly in the more difficult cases.

**Fluoroscopy.** Primary emphasis should be placed upon careful fluoroscopy done by an examiner whose eyes have been well accommodated to darkness. Accommodation should be carried out for at least 20 minutes and preferably 30 minutes. It is important that fluoroscopic examination of the duodenal cap be carried out

in upright supine, and prone projections as well as in various oblique positions. Palpation should be carried out in order to empty the bulb of excessive barium and to elicit possible tenderness. Bulb filling and emptying should be carefully observed.

**Spot Films.** Spot films of the duodenal cap should always be obtained otherwise, a small percentage of duodenal ulcers will be missed. Films should, of course, be of the best technical quality possible and should be made with a pressure spot film device. Views in frontal and oblique projections should be obtained. In certain cases, particularly in examinations performed on hypersthenic individuals, demonstration of the duodenal cap which is obscured by the barium filled antrum in frontal projections can be obtained in oblique or true lateral projections. Pressure spot films of the duodenal cap should always be obtained when possible because a significant percentage of ulcers may be obscured by the barium distended bulb lumen. This is particularly true in cases which show little bulb spasm. This compression will have the effect of displacing the barium from the bulb with the exception of that which is collected in the ulcer crater. Around the crater a radiolucent halo is frequently seen in the area of adjoining mucosal edema (fig 4).

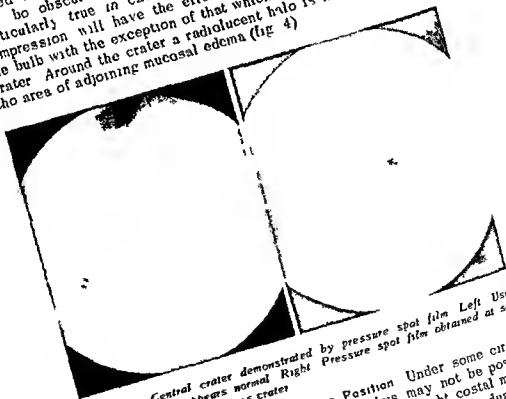
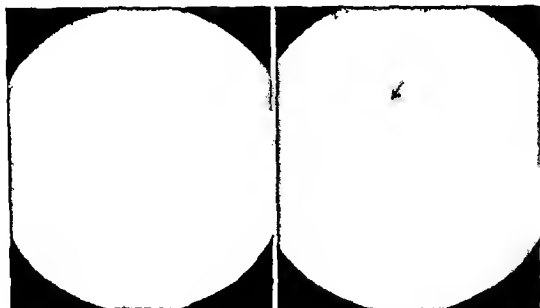


Figure 4 Central crater demonstrated by pressure spot film. Left Usual oblique view appears normal. Right Pressure spot film obtained at same examination clearly shows crater.

**Spot Films With Patient in Prone Position.** Under some circumstances however, compression spot films may not be possible when the duodenal bulb is located under the right costal margin. This again is particularly true in hypersthenic individuals. In

such cases, prone spot films may be of definite value because the pressure of the table against the patient's abdomen may be sufficient to somewhat empty the duodenal bulb. Prone spot films may also be of considerable value when the duodenal bulb is so irritable or spastic that it will not remain filled in the upright position sufficiently long to obtain good spot films. The method will also overcome the problem of air trapped in the duodenal bulb, often encountered when the patient is examined upright. The prone method may also be expected to delineate a shallow anterior wall ulcer otherwise not demonstrable (fig. 5).



*Figure 5 Apical crater demonstrated by spot film with patient in prone position. Left: Usual oblique view appears normal. Right: Oblique spot film patient in prone position, right side dependent, clearly shows apical crater.*

**Air Contrast Spot Films.** In hypersthenic individuals in whom palpation of the duodenal bulb is not possible, air contrast examination of the duodenal cap is frequently of value, particularly when a crater in the posterior wall is present. With the patient in the supine position and the right side slightly elevated, the gas bubble normally present in the stomach is displaced into the antrum. Within a short time some gas will pass through the pylorus into the duodenal cap, allowing visualization of the crater through the air-filled bulb as described by Hampton<sup>13</sup> and emphasized by Meyer<sup>14</sup> (fig. 6). If the gas bubble in the stomach is small or absent, a small quantity of carbonated material or Seidlitz powders can be given, as suggested by Hinkel and Moller.<sup>15</sup> In some instances of very shallow ulcers of the posterior wall this method is the only one by which the crater can be shown.

**Demonstration of Bulb Through Air Filled Antrum.** When some patients are turned obliquely in either the upright or prone position, the duodenal bulb cannot be seen against the barium-filled body of



the stomach. Once again this is particularly true of hyper theic individuals in whom the bulb cannot be seen in frontal projection either. In these individuals spot films of the duodenal bulb through



Figure 6 Crater demonstrated by air contrast bulb technique. Left Crater is seen in profile. Right Another niche is seen en face.

the air filled antrum may be the only method allowing visualization of the cap (fig 7). This may be easily carried out by using a small quantity of barium and carbonated beverage or Seidlitz powder.



Figure 7 Crater demonstrated through air contrast antrum. Left Barium-filled antrum obscures bulb. Note retained food particles. Bulb could not be seen in oblique or lateral projections whether patient was upright, prone or supine. Right Crater shown through air filled antrum on repeat study done with Seidlitz powders. Crater confirmed at operation.

**Other Views** In rare instances certain other views may be of value in demonstrating the bulb that is difficult to visualize in the usual way. Among these are a lateral film made with the patient prone. This drops the stomach anteriorly away from the posterior

fixed duodenum. A decubitus film with the patient lying on the left side will allow displacement of the stomach to the left of the relatively fixed duodenum and may allow a clear demonstration of the cap.

### HEALING OF DUODENAL ULCER

The problem of recognizing healing of a duodenal ulcer by roentgenography has been stated to be more difficult than the actual demonstration of the ulcer itself. Certainly a duodenal ulcer may be diagnosed as healed if the duodenal cap returns to an absolutely normal appearance (fig. 8). However, the presence of some residual

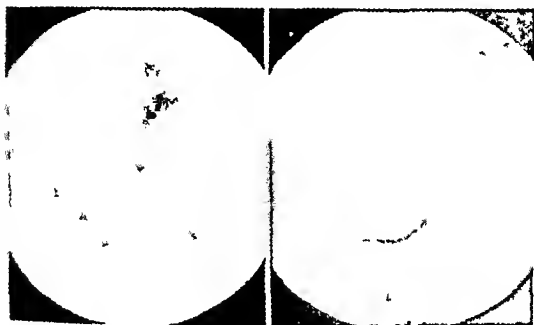


Figure 8. Healing of duodenal ulcer. Left: Pressure spot film shows crater. Right: Normal bulb after seven weeks of medical treatment.

deformity, even if a crater can no longer be shown, does not permit the diagnosis of healed duodenal ulcer. Small ulcerations may go undetected because of the deformity. The absence of irritability or spasm of the duodenal cap is of considerable importance, but these findings, particularly when minimal, are frequently difficult to assess. Diagnosis of healing based on the absence of these signs should be made with caution. In the presence of a deformed duodenal bulb, the most reliable criterion is the finding of persistent unchanged deformity despite the lack of prolonged observation. This should be correlated with the absence of clinical symptoms or signs.

Rarely, an apparent crater may persist indefinitely. In actuality, this is not a crater but a cicatricial pocket, healed but with enough depth to collect barium. Again, prolonged observation without evidence of change in asymptomatic individuals distinguishes this from an active ulcer (fig. 9). At times such a pocket may be

so large that it simulates a duodenal diverticulum. Under many circumstances strong pressure may be brought to bear on the radiologist to state whether or not the ulcer is absolutely healed. Temptation to make a definite statement should be resisted until observation shows that no change in the deformity has taken place for several weeks or, preferably months.

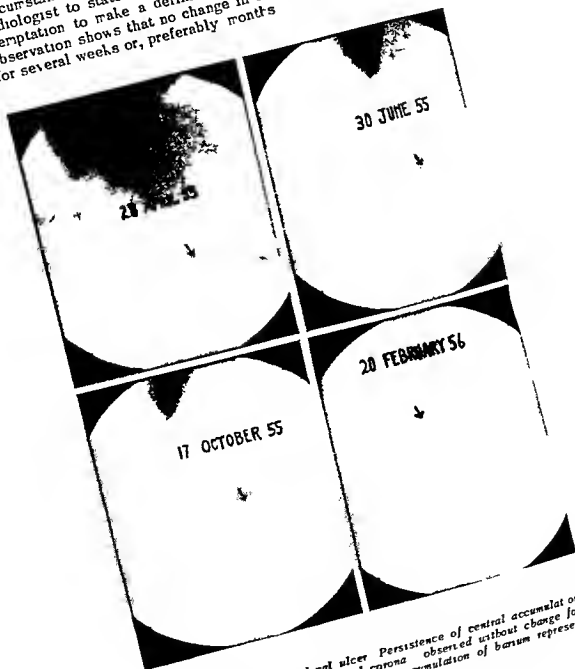


Figure 9 Healing of duodenal ulcer. Persistence of central accumulation of barium with Forssell's mucosal corona observed without change for 10 months in an asymptomatic patient. Accumulation of barium represents a healed cicatricial pocket with puckered bulb.

## SUMMARY

The incidence of duodenal ulcer is increasing, and its accurate diagnosis in members of the Armed Forces is of extreme importance. Careless or inept examinations are less than valueless, they can do much harm by resulting in erroneous opinions. Because of the heavy reliance placed on the roentgenographic diagnosis and follow-up of patients, the primary and secondary signs of duodenal ulcer have been reviewed and certain technical maneuvers for the resolution of more difficult cases have been reported and demonstrated.

## REFERENCES

- 1 Hamilton E L, Sullivan B H Jr and Palmer E D. Duodenal ulcer in military personnel: studies on military effectiveness of ulcer patients: magnitude of problem. *U S Armed Forces M J* 3: 831-838, June 1952.
- 2 Palmer E D and Sullivan B H Jr. Duodenal ulcer in military personnel: studies on military effectiveness of ulcer patient problem. *U S Armed Forces M J* 3: 455-459, Mar 1952.
- 3 Palmer E D, Sullivan B H Jr and Hamilton E L. Duodenal ulcer in military personnel: studies on military effectiveness of ulcer patient: review of 350 cases of recurrent duodenal ulcer. *U S Armed Forces M J* 3: 1123-1133, Aug 1952.
- 4 Sherman J L Jr. Final common pathway in ulcer genesis. *U S Armed Forces M J* 7: 1001-1008, July 1956.
- 5 Hodges F J. *The Gastro-Intestinal Tract: A Handbook of Roentgen Diagnosis*. Year Book Publishers Inc, Chicago, Ill, 1944, p 98.
- 6 Hockus H L. *Gastro-enterology*. W B Saunders Co, Philadelphia, Pa, 1944, Vol I, pp 392-398.
- 7 Buckstein J. *The Digestive Tract in Roentgenology*, 2d edition. J B Lippincott Co, Philadelphia, Pa, 1953, pp 250-274.
- 8 Golden R (editor). *Diagnostic Roentgenology*. Thomas Nelson & Sons, New York, N Y, 1952, Vol I, pp 340X-341D.
- 9 Rutvo M and Shaulfer I A. *Gastro-intestinal X-ray Diagnosis*. Lea & Febiger, Philadelphia, Pa, 1952.
- 10 Sandweiss D J (editor). *Peptic Ulcer*. W B Saunders Co, Philadelphia, Pa, 1951, pp 217-227.
- 11 Shanks S C and Kerley P J (editors). *Textbook of X-ray Diagnosis*. W B Saunders Co, Philadelphia, Pa, 1950, Vol III, pp 177-189.
- 12 Kirklin H R. Roentgenologic consideration of duodenitis. *Radiology* 17: 377-381, May 1929.
- 13 Hampton A O. Safe method for roentgen demonstration of bleeding duodenal ulcers. *Am J Roentgenol* 38: 565-570, Oct 1937.
- 14 Meyer R R. Air contrast study of duodenal bulb: its importance in diagnosis of duodenal ulcer. *Radiology* 58: 393-399, Mar 1952.
- 15 Hinkel C L and Moller G A. Routine barium gas examination of duodenal bulb. *Am J Roentgenol* 75: 291-296, Feb 1956.

so large that it simulates a duodenal diverticulum. Under such circumstances strong pressure may be brought to bear on the radiologist to state whether or not the ulcer is absolutely healed. Temptation to make a definite statement should be resisted until observation shows that no change in the deformity has taken place for several weeks or preferably, months.

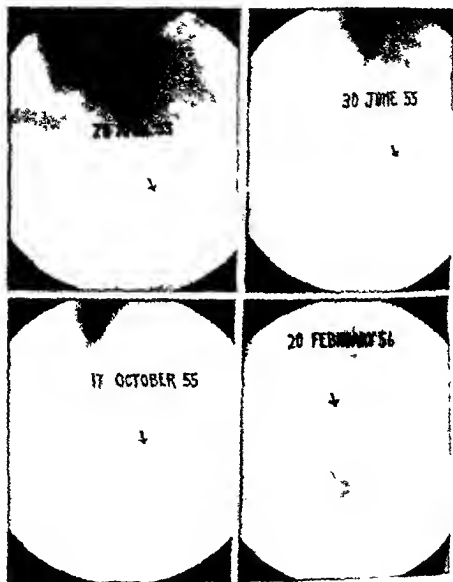


Figure 9 Healing of duodenal ulcer. Persistence of central accumulation of barium with Forssell's "mucosal corona," observed without change for 1 month in an asymptomatic patient. Accumulation of barium represents healed cicatricial pocket with "puckered bulb."

expensive, and all plastic parts are discarded after each case. Basically, it consists of a blood inlet tube, an oxygen inlet tube, a diffusion disk, a vertical oxygenating tube, a debubbling cham-

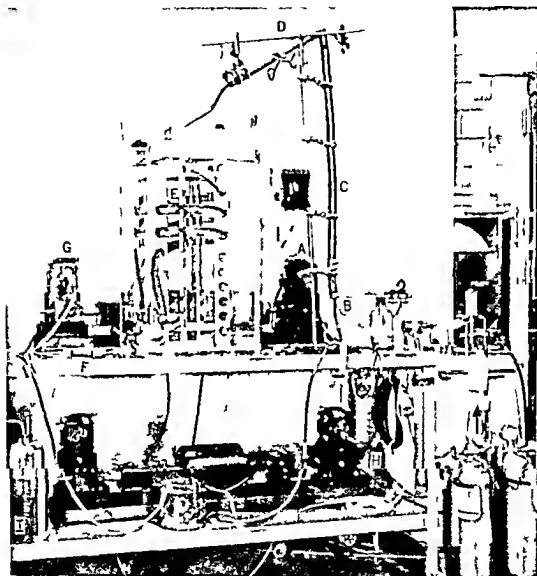


Figure 1 Pump oxygenator for cardiac bypass (A) Venous end of Sigmamotor pump receiving inflow from venae cavae and coronary sinus reservoir pumping blood into oxygenating tube (B) Oxygen inlet (C) Oxygenating tube (D) Debubbling chamber (E) Helix reservoir in water bath (F) Blood filter (G) Arterial end of pump (H) Reservoir and pump for return of blood from coronary sinus (I) Reservoir for measuring blood loss via suction.

ber, and a helix reservoir for additional debubbling. The debubbling chamber is thinly coated with Antifoam A. Blood is withdrawn from the patient through catheters in the superior and inferior venae cavae and returned to the patient via a catheter placed in the lumen of the aorta through the subclavian artery. A Sigmamotor pump is utilized in the circuit.

The following is a report of the first three cases of intra cardiac surgery performed with the aid of an artificial oxygenator at this hospital

### CASE REPORTS

**Case 1** A 27 month-old boy had suffered some decreased exercise tolerance accompanied by frequent upper respiratory infections, cyanosis and syncope since birth. His condition had become progressively worse prior to his final admission on 25 July 1956. On 8 February 1956 cardiac catheterization (table 1) was performed followed by angiocardiology. Catheterization revealed a left to right shunt at the atrial level, pulmonary stenosis, and a persistent left superior vena cava. Angiocardigrams suggested the presence of an intraventricular septal defect in addition to the other anomalies. Physical examination revealed a poorly developed cyanotic child.

TABLE 1 Cardiac catheterization on data for case 1

	Oxygen saturation (per cent)	Pressure (mm Hg)
Superior vena cava (left)	70	
High	87	
Low	60	
Superior vena cava (right)	71	16/6
Inferior vena cava	81	100/0
Right atrium	82	24/10
Right ventricle	81	105/68
Pulmonary artery	62	
Femoral artery		

The blood pressure was 105/68 mm Hg and the erythrocyte count was 6 000 000/ $\mu$ l. There was a loud harsh systolic murmur audible over the entire precordium, loudest in the second and third intercostal space to the left of the sternum. A systolic thrill was also palpable in this region. Roentgenograms revealed right ventricular and left atrial enlargement with a decrease in the pulmonary vascular markings. On 27 July an operation was performed via a transverse bilateral anterior thoracic incision. It was noted that the left superior vena cava entered the left atrium. This vessel was then ligated. Total cardiac bypass was accomplished with perfusion by means of the pump oxygenator. A right ventriculotomy was performed and a 1 by 1½ cm intraventricular septal defect was repaired with the aid of a patch of Ivalon (brand of polyvinyl) sponge. The defect was located high in the right ventricle. A pulmonary valvotomy was performed relieving the pulmonic stenosis. Through an atrial incision a 2 by 2½ cm atrial septal defect was repaired by direct suture. Total

cardiac bypass lasted 31 minutes Postoperatively, the patient did moderately well, however complete heart block which had ensued following closure of the atrial septal defect persisted Thirty six hours postoperatively, respiratory difficulty and cyanosis appeared A tracheostomy was performed with some temporary improvement but 12 hours later cyanosis and circulatory failure recurred, followed by death

**Comments** Autopsy revealed complete repair of the defects Death can be attributed to cardiac failure subsequent to repair of multiple defects and persistence of complete heart block.

**Case 2** A six year-old girl had a heart murmur since infancy, retardation of growth, frequent respiratory infections and exercise intolerance Cyanosis of the lips had been noted on occasion Physical examination revealed a loud systolic murmur over the precordium, most prominent in the fourth intercostal space to the left of the sternum accompanied by a marked thrill The blood pressure was 100/60 mm Hg and the second pulmonic sound was somewhat prominent Roentgenograms revealed an enlarged right ventricle with evidence of increased pulmonary blood flow Cardiac catheterization (table 2) on 22 October 1955 revealed a left to right shunt at the ventricular level and a 40-mm pressure gradient across the pulmonic valve Systemic arterial

TABLE 2 Cardiac catheterization data for case 2

	Oxygen saturation (per cent)	Pressure (mm Hg)
Superior vena cava	58	
Inferior vena cava	68	
Right atrium	55	20/5
Right ventricle	77	100/0
Pulmonary artery	77	60/18
Left pulmonary artery		44/16
Femoral artery	86	100/60

oxygen saturation was 86 per cent These findings were interpreted as consistent with the tetralogy of Fallot accompanied by a bidirectional shunt On 14 August 1956 a right ventriculotomy was performed and a high 1.5 by 1 cm ventricular septal defect with firm fibrous edges was closed with a series of interrupted silk sutures Pulmonary infundibular stenosis was present and relieved by excision of the obstructing tissue Postoperatively the patient did well until the evening of surgery at which time repeat thoracotomy was necessitated by a bleeding from a small coronary artery Subsequently the patient had an uneventful postoperative course and was discharged on the 21st postoperative day At the time of discharge there was no thrill and only



a Grade 1 systolic murmur was audible over the pulmonic area. The patient is doing well five months after operation

Comments "Overriding of the aorta," a classical concomitant of the tetralogy of Fallot is more a functional than anatomic factor. Repair of the ventricular septal defect in these cases presents little more difficulty than encountered in repair of ventricular septal defect unaccompanied by pulmonary obstruction

Case 3. A two and one-half year old Hawaiian boy was admitted to this hospital on 29 August 1956. He had had six previous hospitalizations for bronchopneumonia and cardiac failure. A cardiac murmur had been detected shortly after birth and he had received digitalis since the age of six months. Development had been normal weight gain was poor in the interim between hospital stays he manifested moderate exercise intolerance. Physical examination revealed a bulging precordium with a harsh systolic murmur and thrill most prominent in the fourth intercostal space to the left of the sternum. The second pulmonic sound was markedly accentuated. Roentgenograms showed tight ventricular hypertrophy and some left atrial enlargement. Electrocardiogram was characteristic of right ventricular hypertrophy. Cardiac catheterization data is shown in table 3. On 6 September using the artificial oxygenator a large 2.5 cm ventricular septal defect

TABLE 3 Cardiac catheterization data for case 3

	Oxygen saturation (per cent)	Pressure (mm Hg)
Superior vena cava	64	
Inferior vena cava	67	
Right atrium	60	94/0
Right ventricle	72	75/37
Pulmonary artery	72	121/82
Femoral artery	98	

was repaired through a ventriculotomy incision. The defect was located posteriorly and high in the septum the tricuspid annulus comprising the right margin of the defect. A pledget of polyvinyl sponge was used to buttress the closure. Cardiac bypass lasted 42 minutes. Postoperatively the patient had an uneventful course. A soft systolic pulmonic murmur persists. The thrill has disappeared. A roentgenogram of the chest revealed decreased engorgement of the pulmonary vessels.

Comments To date (five months postoperative) this child has done well. Both patients (cases 2 and 3) have had no respiratory infections postoperatively. The mothers have been amazed by the marked increase in the activity of these two children.

## SUMMARY

An artificial bubble oxygenator has been used in the repair of a congenital cardiac defect in three children. Successful repair was accomplished in one child with a ventricular septal defect, and in a second with the tetralogy of Fallot. A third patient with the tetralogy of Fallot and a left superior vena cava draining into the left atrium, succumbed from the combined effects of complete heart block and congestive heart failure.

## REFERENCES

1. Lewis F. J. and Taulic M. Closure of atrial septal defects with aid of hypothermia, experimental accomplishments and report of one successful case. *Surgery* 33: 52-59 Jan. 1953.
2. Gibbon, J. H. Jr. Application of mechanical heart and lung apparatus to cardiac surgery. *Minnesota Med.* 37: 171-180 1954 Mar 1954.
3. Lillehei C. W. Cohen M. Warden H. E. and Varco R. L. Direct-vision intracardiac correction of congenital anomalies by controlled cross circulation, results in 32 patients with ventricular septal defects, tetralogy of Fallot and atrio-ventricularis communis defects. *Surgery* 38: 11-29 July 1955.
4. Lillehei C. W., DeWall R. A., Read R. C., Warden, H. E. and Varco R. L. Direct vision intracardiac surgery in man using simple disposable artificial oxygenator. *Dis Chest* 29: 18 Jan. 1956.
5. DeWall R. A., Warden, H. E., Read R. C., Gott, V. L., Ziegler N. R., Varco R. L., Lillehei C. W. Simple expendable artificial oxygenator for open heart surgery. *S Clin North America* 36: 1025-1034 Aug 1956.
6. Kirklin J. W., Dushane J. W., Patrick R. T., Donald, D. E., Hetzel P. S., Harshbarger H. G. and Wood E. H. Intracardiac surgery with aid of mechanical pump-oxygenator system (Gibbon type); Report of 8 cases. *Proc Staff Meet. Mayo Clin.* 30: 201-206, May 18 1955.
7. Rivkin L. M., Varco R. L., Winchell P. W. and Lillehei C. W. Management of surgically produced complete heart block, clinical and experimental data. To be published in *J Thoracic Surg*.

## FACT AND FANCY

It is not easy for the student or physician to move through a busy career and maintain a lively curiosity. Too often we encounter satisfaction and even complacency in the state ment. We must not go beyond the facts. 'I belong to a school which holds that we must encourage our pupils to let fancy roam where it will. The danger line between fact and fancy will never be obscured when fancy is habitually encouraged to formulate tests whereby its truth may be examined."

—ASHLEY WEECH M. D.  
in *Journal of Medical Education*  
p 106 Feb 1956

# MITRAL COMMISSUROTOMY AT AN ARMY HOSPITAL

DAVID E THOMAS Lieutenant Colonel MC USA

**M**ANY people have contributed to the development of mitral commissurotomy as a standard operation for mitral stenosis. To mention a few, Souttar<sup>1</sup> in 1920 used a technic similar to that employed today and had a successful result in one case. His colleagues were so unimpressed or alarmed that no more cases were so unimpressed of this century, the 80 per cent mortality in the third decade justified a gloomy outlook for surgical treatment.

Bailey<sup>2</sup> inaugurated the modern era by performing an unsuccessful finger fracture of the mitral valve in 1916. He as well as Harken and associates<sup>3</sup> performed successful valvulotomies with instrumental aid in 1948. Following these pioneer efforts progress was rapid and at the present time there are many 3 to 5 year follow up reports in the literature.

Most articles report an operative mortality varying from 0 per cent<sup>4</sup> to 20 per cent<sup>5</sup> in Class IV cases. Huzman and associates<sup>6</sup> reported an over all mortality of 9 per cent in 67 cases with the rate varying from 0 per cent in Class II to 30 per cent in Class IV. Mortality was high if associated aortic valve lesions were present. Eighty four per cent of the patients had an excellent to good result on 1 to 2 year follow up. From 1 000 cases followed up to 7 years Bailey and Bolton<sup>7</sup> found that (1) nearly 90 per cent of the survivors were improved, (2) the early mortality rate was 8 per cent, (3) late deaths accounted for 5.6 per cent and (4) that mild postoperative mitral insufficiency was of no significance but that marked insufficiency was very serious. They also observed that recurrences do happen.

Swann and associates<sup>8</sup> believed that the degree of calcification of the valve determined the postoperative result, while Bafer Brock, and Campbell<sup>9</sup> showed that irrespective of calcification the result correlated with what the surgeon believed he accomplished—the larger the postoperative orifice without regurgitation the better the result. These authors also showed

From Fitzsim as Army II Pital Denver Colo. Lt Col. Thomas is now assigned to Valley Forge Army Hospital Phoenixville Pa.

that (1) the percentage of patients in the excellent category declined slightly year by year; (2) restenosis can occur with further rheumatic activity, and (3) that pulmonary hypertension, when checked by cardiac catheterization a year or two after commissurotomy, reverts to normal in cases having an excellent result

Glover, O'Neill, and Janton<sup>9</sup> showed that only 8 per cent of 50 patients on 5 year follow-up had no murmurs, 19.5 per cent had postoperative evidence of rheumatic activity, and 24 per cent had smaller cardiac silhouettes

### PRESENT STUDY

This analysis includes 33 consecutive cases in which operation was performed from October 1953 to January 1955. In one of the cases, reoperation was necessary. The patients were placed in four categories closely corresponding to those used by the American Heart Association (table 1)

TABLE 1 *Clinical classification of patients with mitral stenosis*

Class	Number of patients
I Physical signs of mitral stenosis are present, but the patient is asymptomatic	4
II The patient is symptomatic, but there are only minor limitations of activity and the process is not showing progression	13
III Symptoms are progressive there is moderate to marked limitation of activity the patient may exhibit auricular fibrillation hemoptysis, acute pulmonary edema and has only a limited response to cardiac drugs and bed rest	14
IV The patient is bedridden with chronic heart failure	2
Total	33

Only 1 of our patients was on active duty, 1 was retired, 1 was a Red Cross worker, and 30 were civilian dependents. This is readily explained since rheumatic disease is a cause of rejection for military service.

The distribution according to age noted in table 2 corresponds with that generally found. This indicates that mitral stenosis most often causes the patient to seek aid between 20 and 40 years of age. Three of the six deaths occurred in patients of ages between 47 and 59 years.

TABLE 2 Age distribution of patients

Age (years)	Number of patients
Less than 20	2
20 to 30	12
30 to 40	12
40 to 50	6
50 plus	1
Total	33

As table 3 indicates mitral stenosis without insufficiency was the lesion most commonly found. Insufficiency of varying degree was found in a significant number of cases this sometimes having been diagnosed prior to operation. Commissurotomy in the presence of slight insufficiency was found to be indicated since the procedure seldom increased and occasionally decreased the amount of regurgitation. However, as will be discussed the postcommissurotomy regurgitation syndrome is a real entity and one to be feared.

TABLE 3 Lesions encountered at operation

Lesion	Number
Mitral stenosis	25
Mitral stenosis with insufficiency	7
Multivalvular	2
Other (pneumonia)	1

The early mortality rate in this series was 12 per cent total 18 per cent. Operative complications were far from unusual and included 3 auricular tears, 2 ventricular fibrillations, 1 cardiac standstill, 1 ventricular tear, 1 cerebral embolus, 1 marked regurgitation after commissurotomy requiring attempt at operative

correction, 1 inadequate commissurotomy due to a small auricular appendage, and the incidental finding of an early virus pneumonia with serofibrinous pleurisy. Postoperative complications included 4 cases of persistent auricular fibrillation, 2 cases each of thrombophlebitis, hydrothorax, and pericardial effusion, 1 atelectasis, and 1 bacterial endocarditis and septicemia caused by *Micrococcus pyogenes var albus*.

Poor results (table 4) included one unsuccessful operation due to a small auricular appendage. This patient was reoperated on under hypothermia with a bilateral approach and his status changed from Class III to Class I. The other poor results were due to postcommissurotomy mitral regurgitation in three patients.

TABLE 4 Operative results

Commissurotomy method	Total number of operations	Results			
		Improved	Unimproved or worsened	Died	
				Early	late
Finger fracture	33	23	4	1	2
Use of valvulotome	1	1			
Total	34	24	4	4	2

Two of these operations were on the same patient.

Operative deaths included a Class IV, 59 year old man with trivalvular disease and extensive arteriosclerosis who was accepted for commissurotomy knowing he was a very poor risk. A 47 year old, female, Class II patient, considered to be an excellent operative risk, developed ventricular fibrillation, during surgical intervention, that converted only after a prolonged period. She never regained consciousness and died of bronchopneumonia during the early postoperative period. Cerebral embolism prior to opening the auricle caused death in a 47 year-old, Class II patient who had fibrillation. It is interesting to note that 3 of the 4 deaths occurred in our 7 patients over 10 years of age.

The fourth death occurred in a 29 year old, Class II patient who at thoracotomy was found to have an early virus pneumonia. The lungs were heavy and serofibrinous pleurisy was present. The patient developed marked regurgitation after commissurotomy. This was repaired by placing a transventricular suture in the posterior commissure. In addition, temporary cardiac standstill occurred when the pericardium was closed. This unfortunate patient died of bronchopneumonia on the fourth postoperative day.

Late deaths included that of a 35 year old, Class IV patient with a diagnosis of mitral stenosis and insufficiency and aortic insufficiency. She developed or had a reactivated bacterial endocarditis and septicemia caused by *M pyogenes* var *albus* and died two and one-half months after surgical intervention.

The other late death occurred in a 24 year old Class I patient who was operated on because pulmonary hypertension had been demonstrated. The preoperative diagnosis was mitral stenosis and insufficiency. The operation was uneventful. A stenotic orifice was adequately fractured without creating significant insufficiency. During her convalescence auscultation revealed a marked decrease in the diastolic murmur. She gradually developed cardiac decompensation and died elsewhere 17 months after commissurotomy. Autopsy revealed a severe mitral stenosis. One can only conclude that the leaflets reapposed.

Examination three to six months after surgical intervention generally reveals the usual physical signs of mitral stenosis. Two patients revealed normal physical findings and these patients, one over 40 years of age, have had excellent results. As has been mentioned before, the murmur of mitral insufficiency is frequently heard postoperatively. This is associated with a poor result only if the degree of insufficiency is severe.

### CONCLUSIONS

The surgical relief of mitral stenosis is not without hazard, inasmuch as it carries a significant operative mortality and may actually result in symptomatic worsening of the patient. However, in the properly selected patient, improvement after surgical intervention is the usual outcome and results may be dramatic. This study suggests that patients with great care. Operation on Class IV patients and those with multivalvular disease has a greatly increased risk. Class I patients should not be operated on but should be followed and surgical intervention recommended at such time as progression becomes apparent.

While mitral commissurotomy is one of the simpler cardiac operations, it is not one to be recommended casually. It carries a significant operative and late operative mortality and may be followed by a progression of symptoms. The value derived justifies the risks involved in the properly selected case.

### REFERENCES

1. Scottar, H. S. Surgical treatment of mitral stenosis. *Brit. M. J.* 2: 603-606, Oct. 3, 1973.
2. Bailey, C. P. Surgical treatment of mitral stenosis (mitral commissurotomy). *Dis. Chest* 15: 377-397, Apr. 1949.
3. Harken, D. E. Ellis, L. B. Ware, P. F. and Norman, L. R. Surgical treatment of mitral stenosis, valvuloplasty. *New England J. Med.* 239: 801-809, No. 25, 1948.

4. Kuzman W J Griffith G C Jones J C and Meyer B W Mitral stenosis clinical diagnosis treatment and follow-up of a select group *A. M. A. Arch. Int. Med.* 97 466-482 Apr 1956.
  5. Bailey C P and Bolton H E. Criteria for and results of surgery for mitral stenosis results of mitral commissurotomy *New York J. Med.* 56 825-839 Mar. 1956.
  6. Cohen M. Mitral valvulotomy results of a preliminary survey in 104 consecutive cases. *Canad. M. A. J.* 74 788-792 May 1956.
  7. Swann W K Bradsher J T Jr Lomasney T L and Rodriguez J A Results of surgery for mitral stenosis. *Am. Surgeon* 21 996-1000 Oct 1955
  8. Baker C Brock R and Campbell M. Mitral valvotomy Follow-up of 45 patients for 3 years and over. *Brit. M. J.* No 4946 983-991 Oct. 22, 1955
  9. Glover R P O'Neill T J., and Janton O H. Analysis of 50 patients treated by mitral commissurotomy 5 or more years ago *J Thoracic Surg* 30 436-451 Oct. 1955.
  10. French S W and Hewlett T H Mitral commissurotomy *U. S. Armed Forces M. J.* 6 193-203 Feb 1955
- 

#### BLOOD GROUPS AND GASTRIC CANCER

"In 119 cases of carcinoma of the stomach the excess of blood group A over blood group O was due to an association between group A and carcinoma of the pyloric end of the stomach

"There was no excess of group A in carcinoma arising in the body of the stomach and hence this material provides no support for the hypothesis that group A is associated with atrophy of the acid producing mucosa and achlorhydria

"The antral mucosa of persons with blood of group A is apparently more liable to inflammation and carcinoma than that of group O persons "

—D JENNINGS B M R H BALME, B M  
and J E RICHARDSON, M S  
in *Lancet*  
p 12 7 July 1956



# EVALUATION OF PANCREATIC EXOCRINE FUNCTION AND INTESTINAL ABSORPTION WITH RADIOACTIVE FAT

## Preliminary Report

RICHARD P. SPENCER *Lieutenant MC USNR*  
CHARLES R. HENKELMANN *Lieutenant MC USNR*  
E. PICHARD KING *Captain, MC USN*

**L**IPASE, a pancreatic enzyme converts fats to fatty acids and glycerin, which are then absorbed from the alimentary canal. When the enzyme is present in sufficient quantity and intestinal absorption is normal, the healthy adult will take up almost 100 per cent of orally administered radioactive fat (olein [triolein] labeled with iodine 131). Failure to absorb the entire dose results in the appearance of abnormal quantities of iodine 131 ( $I^{131}$ ) tagged fat in the stool. Such a finding indicates that either (1) the production or delivery of pancreatic lipase to the gut is deficient or (2) the absorptive apparatus is at fault. The technic used in this study is less complicated than previous procedures<sup>1</sup> for the evaluation of pancreatic and intestinal function with radioactive fat.

## METHOD

Olein  $I^{131}$  is added to a small quantity of a carrier (composed of 200 ml of peanut oil, 200 ml of water, and 15 ml of Tween 80) and is stored for future use. When a dose is to be made, an aliquot containing 25 microcuries of radioiodine is drawn off and diluted with carrier so that the final volume taken by the patient is 1 ml per kilogram of body weight. Another sample is made up in identical fashion, to be used as the standard. Traces of radioactive fat cling to the cup from which the patient drinks the olein  $I^{131}$ . Hence this cup is saved so that its radioactivity can be determined and subtracted from the standard in calculating the dose ingested as discussed below.

The patient drinks a suspension of 10 drops of Lugol's solution and a suitable indicator (such as carmine dye or charcoal) in

---

From Radiology Laboratory, U. S. Naval Hospital Bethesda, Md.

60 ml of water. The Lugol's solution presents the body with a large dose of iodine and prevents significant uptake of radioiodine by the thyroid gland. The indicator is used to mark the complete passage of the material through the digestive tract, and obviates the use of roentgenograms with barium swallow. Immediately after this medication, the patient drinks the olein  $I^{131}$  and carrier mixture.

All stools are saved after the fatty mixture is ingested until traces of the charcoal or carmine marker no longer appear. It would be less accurate to specify an arbitrary number of days required for stool collection. Probably as a result of patients' inactivity in the hospital several days may pass before all the radioactive material has been excreted by some patients. Specimens are collected in 1 quart, leak proof containers and are kept cool or refrigerated to reduce odor and bacterial activity. The standard is also refrigerated to prevent deterioration of the fat. It is of the utmost importance that no urine contaminates the stool, this caution must be repeatedly emphasized to the patients, and also the nursing staff if the procedure is performed in the hospital.

To maintain approximately constant volume, the standard and the cup from which olein  $I^{131}$  was drunk are placed in separate, 1-quart containers, water is added to the top, and the containers are shaken thoroughly after the covers are replaced. Water is also added to the 1 quart container holding the stool sample, and it is also shaken. A scintillation counter (sodium iodide, thallium activated) is used for the radioassays. The container is placed 20 cm from the detection probe, at this distance, the solid angle viewed by the probe includes the entire container. Counts of background, standard, cup, and stool are taken for 3 minutes. The standard registers approximately 25,000 counts during the 3 minute interval, which is well above the background count.

The percent of the administered dose of olein  $I^{131}$  which appears in the stool, may be calculated as follows:

$$\frac{(\text{counts in stool} - \text{background}) \times 100}{(\text{counts in standard} - \text{background}) - (\text{counts in cup} - \text{background})}$$

or, more simply by

$$\frac{(\text{counts in stool} - \text{background}) \times 100}{(\text{counts in standard} - \text{counts in cup})}$$

The individuals undergoing this study were from the medical services of this hospital. Two groups took the test, those with gastro-intestinal disorders and patients with other diseases but without known active alimentary dysfunction.

## RESULTS

Typical results obtained are presented in table 1. The patients in this table were the first 10 individuals on whom the test was performed. Our total series at present includes nearly 30 cases. Although this total number of cases are not fully evaluated, the average excretion in this group both normal and abnormal appears to be *identical* with that of the 10 patients in this preliminary report. Fecal excretion of olein I<sup>131</sup> (or its metabolites) by the "normal" subjects averaged 1.8 per cent ( $\pm 0.8$ ) of the ingested dose ( $\pm 0.8$  is two standard deviations). Elevated excretion of olein I<sup>131</sup> was found to range from 4 per cent (in a male who had a subtotal gastrectomy) to over 50 per cent (in a patient with biliary obstruction due to metastatic carcinoma).

TABLE 1 Stool excretion of olein I<sup>131</sup> in adult patients

Sex	Age (years)	Diagnosis	Excretion in per cent of administered dose
<i>Normal Excretion</i>			
M	24	Nematode infestation	1.7
F	51	Brucellosis	2.0
M	34	Diabetes mellitus	1.3
M	63	Carcinoma of abdomen ? primary	2.3
M	25	Inactive peptic ulcer (duodenal)	1.5
<i>Elevated Excretion</i>			
M	30	Subtotal gastrectomy	4.0
F	68	Sprue in remission	5.9
M	37	Alcoholism chronic pancreatitis	10.4
M	33	Alcoholism active duodenal ulcer ? pancreatitis	10.6
M	55	Ampulla of Vater obstruction of and jaundice due to metastatic carcinoma of colon	50.1

## DISCUSSION

The technic merits further investigation because it offers a means of studying pancreatic function and intestinal absorption—two systems that are notoriously difficult to evaluate. The test is economical for the total cost of the olein-I<sup>131</sup> and carrier is less than a dollar per patient. It can be performed by any laboratory that is equipped to do 24-hour thyroid I<sup>131</sup> uptake studies. Furthermore, there is no trauma to the patient. The procedure

may be done on an outpatient basis, or can be performed while the individual is in the hospital undergoing other diagnostic tests, provided they do not interfere with digestive function or stool collection. The present technic is simplified over previous methods in three respects:

1 A readily detectable dye, such as charcoal or carmine, is used to mark the passage of the ingested material through the digestive tract. Hence, barium swallow and fluoroscopy are not necessary to indicate when the material has been passed. Use of a dye enables the procedure to be done on an outpatient basis.

2 Determination of  $I^{131}$  blood levels are not required. There is no specific indication, therefore, for hospitalizing the patient.

3 The use of one solution as the carrier facilitates handling by the physician or his technicians.

Either a deficit of pancreatic lipase or a decreased absorption of lipids will result in the appearance of fat tagged with radioiodine in the stool. If pancreatic function were normal, then the olein would be split to fatty acids and glycerin, even though absorption were at fault. Hence, a further refinement of the technic would be to fractionate the stool specimen,<sup>2</sup> to observe if the radioactivity is present as olein  $I^{131}$  or its digestion product, oleic acid  $I^{131}$ .

The detection of greater than normal quantities of radioiodine fat in the stool of a postgastrectomy patient has also been noted by Sanders and his co-workers.<sup>1</sup> This may partially account for the nutritional disturbance seen in those who have had their stomach removed, and suggests the possibility that the gastric mucosa produces a substance necessary for the absorption of fat by the intestines.

### SUMMARY

A simplified test using fat tagged with radioiodine in the evaluation of a deficiency of pancreatic exocrine function, or errors in alimentary absorption, is described. The test is easily performed and inexpensive.

Patients with disorders that decrease the amount of pancreatic enzymes reaching the gut (chronic pancreatitis, obstruction of the Ampulla of Vater), and those with decreased intestinal absorption of fats (such as sprue), excrete more of an ingested dose of olein (triolein)  $I^{131}$  in their stool than do adults without active gastro intestinal disease.

Increased stool olein  $I^{131}$  excretion was also observed in a postgastrectomy patient, and a possible role for fat absorption by the gut is discussed.

## RESULTS

Typical results obtained are presented in table 1. The patients in this table were the first 10 individuals on whom the test was performed. Our total series at present includes nearly 30 cases. Although this total number of cases are not fully evaluated, the average excretion in this group, both normal and abnormal, appears to be identical with that of the 10 patients in this preliminary report. Fecal excretion of olein I<sup>131</sup> (or its metabolites) by the "normal" subjects averaged 1.8 per cent ( $\pm 0.8$ ) of the ingested dose ( $\pm 0.8$  is two standard deviations). Elevated excretion of olein I<sup>131</sup> was found to range from 4 per cent (in a male who had a subtotal gastrectomy) to over 50 per cent (in a patient with biliary obstruction due to metastatic carcinoma).

TABLE 1. Stool excretion of olein I<sup>131</sup> in adult patients

Sex	Age (years)	Diagnosis	Excretion in per cent of administered dose
<i>Normal Excretion</i>			
M	24	Nematode infestation	1.7
F	51	Brucellosis	2.0
M	34	Diabetes mellitus	1.3
M	63	Carcinoma of abdomen - primary	2.3
M	25	Inactive peptic ulcer (duodenal)	1.5
<i>Elevated Excretion</i>			
M	30	Subtotal gastrectomy	4.0
F	68	Sp. ulcer in remission	5.9
M	37	Alcoholism - chronic pancreatitis	10.4
M	33	Alcoholism - active duodenal ulcer ? pancreatitis	10.6
M	55	Ampulla of Vater obstruction of and jaundice due to metastatic carcinoma of colon	50.1

## DISCUSSION

The technic merits further investigation, because it offers a means of studying pancreatic function and intestinal absorption, two systems that are notoriously difficult to evaluate. The test is economical for the total cost of the olein I<sup>131</sup> and carrier is less than a dollar per patient. It can be performed by any laboratory that is equipped to do 24 hour thyroid I<sup>131</sup> uptake studies. Furthermore, there is no trauma to the patient. The procedure

may be done on an outpatient basis, or can be performed while the individual is in the hospital undergoing other diagnostic tests, provided they do not interfere with digestive function or stool collection. The present technic is simplified over previous methods in three respects:

- 1 A readily detectable dye, such as charcoal or carrier, is used to mark the passage of the ingested material through the digestive tract. Hence, barium swallow and fluoroscopy are not necessary to indicate when the material has been passed. Use of a dye enables the procedure to be done on an outpatient basis.
- 2 Determination of  $I^{131}$  blood levels are not required. The  $I^{131}$  is no specific indication, therefore, for hospitalizing the patient.
- 3 The use of one solution as the carrier facilitates handling by the physician or his technicians.

Either a deficit of pancreatic lipase or a decreased absorption of lipids will result in the appearance of fat tagged with radioiodine in the stool. If pancreatic function were normal, then the olein would be split to fatty acids and glycerin, even though absorption were at fault. Hence, a further refinement of the technic would be to fractionate the stool specimen to observe if the radioactivity is present as olein  $I^{131}$  or its digestion product, oleic acid  $I^{131}$ .

The detection of greater than normal quantities of radioiodine fat in the stool of a postgastrectomy patient has also been noted by Sanders and his co-workers.<sup>1</sup> This may partially account for the nutritional disturbance seen in those who have had their stomach removed, and suggests the possibility that the gastric mucus produces a substance necessary for the absorption of fat by the intestines.

### SUMMARY

A simplified test using fat tagged with radioiodine in the evaluation of a deficiency of pancreatic exocrine function, or errors in alimentary absorption, is described. The test is easily performed and inexpensive.

Patients with disorders that decrease the amount of pancreatic enzymes reaching the gut (chronic pancreatitis, obstruction of the Ampulla of Vater), and those with decreased intestinal absorption of fats (such as sprue), excrete more of an ingested dose of olein (triolein)  $I^{131}$  in their stool than do adults without active gastro intestinal disease.

Increased stool olein  $I^{131}$  excretion was also observed in a postgastrectomy patient, and a possible role of the stomach in fat absorption by the gut is discussed.

## REFERENCES

- 1 Sanders A P Isley J k Sharpe K B ylin, G J Shingl to W W Hyma  
J C Ruffin J M Reeve R J Radioiodine recovery in f c s following a  $^{131}$   
labeled fat test meal *Am. J Roentgenol* 75 386-389 Feb 1956.
- 2 Savary P and Des lle P Etud chromatographique de l'action de la lipas  
pancreatique sur des triglycides mixtes (Chromatographie de l'hydrolyse de la lipase  
pancreatique sur des triglycides mixtes) *Compt. Rend. Acad. d. sc.* 240 2571-2573 J c  
27 1955

## PLASMA AMYLASE IN RENAL INSUFFICIENCY

Plasma amylase concentration may be markedly elevated in some cases of acute renal insufficiency without implying an associated acute pancreatitis. Although trauma, opiates and possibly chemical derangements may enhance amylase concentration by increased production, the diminished urinary excretion appears to be the major cause of the protracted and exaggerated levels. When chemical and clinical uremia was modified by artificial kidney dialysis the plasma amylase was not consistently affected and fluctuated at high levels. The urine plasma amylase was found to vary greatly and was not therefore of diagnostic import.

—WILLIAM H. MERONEY, M.D.  
NATALIE L. LAWSON, M.S.  
MILTON E. RUBINE, M.D.  
and JOHN V. CARBONE, M.D.  
in *New England Journal of Medicine*  
p. 320 Aug. 16, 1956

# PRACTICAL ALLERGY PROGRAM FOR SMALL MILITARY INSTALLATIONS

MERLE S. SCHERR *Captain MC USA*

**F**ACILITIES for the care of allergic patients in military installations usually have been limited to the larger hospitals, although some small hospitals have had basic facilities for medical officers who were interested in the specialty. The need for a practical allergy program for the smaller hospitals and clinics has long been recognized. This article outlines a basic program for military physicians to use in treating allergic patients in units where a qualified allergist is not available. A complete allergy program has been described in a technical bulletin.<sup>1</sup>

The majority of patients treated without referral to a large hospital will be those with seasonal and perennial allergic rhinitis, mild bronchial asthma, and related disorders. Because these patients do not need to be hospitalized, a practical plan for treating them in the small clinic or hospital will save time, transportation, and money, and will permit them to begin and continue treatment under the care of the same medical officer.

## CONTROL OF DUST AND DIET

This article deals primarily with the requirements for basic skin testing and treatment, and if proper dust precautions and dietary studies are used, a large amount of testing of the average patient will be unnecessary. The physician should instruct the patient in procedures designed to free his environment of the common inhalants and allergens such as feathers, house dust, animal danders, and fly spray. Suggested directions for the preparation and maintenance of a dust free room, which should be followed to the fullest extent that conditions permit, are as follows:

For best results the home and environment of dust sensitive persons must be maintained as free from dust as possible. In at least one room all sources of dust should be eliminated. The bedroom is usually the most suitable for this purpose.

From Fitzsimons Army Hospital Denver, Colo. Dr. Scherr is now at 603 Atlas Bldg., Charleston, W. Va.



All rugs curtains and drapes should be removed. The room should contain only one bed preferably an iron one. If a second bed is necessary it also must be prepared as described. Wash the bed springs and slats thoroughly. Cover the pillows mattress and springs (if box type used) with allergen proof encasings. The encasings must be sealed or sewed on to ensure airtightness. The bed should be made up frequently with fresh plain linen. No mattress pad should be used. Coverings should be plain and washable. Stuffed comforts or quilts are not permissible.

The walls floors picture molding baseboards and furniture should be washed and the woodwork preferably waxed. Furniture including chairs should be wooden and easily washable. Upholstered or cloth covered chairs are not permissible.

All bookcases pictures or wall plaques should be removed and all cracks and holes sealed. Furnace pipes leading into the room should be sealed. If hot air heat must be used outlets should be covered with cheesecloth or preferably the system air conditioned and filtered. Radiators should be scrubbed.

The room should be cleaned daily and thoroughly cleaned once a week. Closets should be cleaned the same as the room and clothing kept elsewhere. Avoid moth proofing and deodorants as the ingredients are possible allergens.

If the patient is a child do not keep toys in the room except for washable toys that will not accumulate dust. No stuffed toys are allowed.

Dressing and undressing should be done outside this room which should be used for resting and sleeping only. Avoid irritating odors such as gas paint and smoke. Do not allow pets in the house without specific permission.

The above instructions should apply to the entire house of a dust sensitive patient but practicability must be considered. However the one room should be properly prepared and maintained and the rest of the house kept as free from dust as possible. Where occupational dust conditions cannot be controlled and a change of occupation is not feasible a dust respirator should be used.

The physician should also be familiar with dietetic procedures, because proper elimination diets and food diary studies such as are described in the *Standard Army Diet Manual* will be of great diagnostic aid and usually will make it unnecessary for the patient to be subjected to skin tests for food allergens. If a complete survey is needed it should be performed at the nearest general hospital having a qualified allergist and allergy clinic.

## EQUIPMENT AND SUPPLIES

Basic equipment items such as 1 ml tuberculin syringes, one half inch No. 27 hypodermic needles, alcohol sponges, and tourniquets are available at all military medical installations. The only preparations necessary in addition to 70 per cent alcohol, diluting fluid, and 1:1,000 aqueous, injectable epinephrine will be the actual allergenic extracts. The same extracts used for treatment will be employed in weak dilutions for intradermal testing.

The basic allergens, adequate for handling most patients in the average small clinic or hospital, are house dust, feathers, mold mix (*Alternaria* and *Cladosporium*), tree pollen mix, grass pollen mix, and weed pollen mix. The tree, grass, and weed pollen mixes should contain the particular pollens found in the immediate area. A summary of important pollens by geographic regions is shown in table 1, and the physician wishing to learn in detail what pollens are present in his area may do so by consulting the standard textbooks of allergy,<sup>2,3</sup> or by writing to the Secretary, Pollen and Mold Committee, American Academy of Allergy, 208 East Wisconsin Ave., Milwaukee 2, Wis., for the complete pollen survey of the area.

Ideally, individual pollens rather than a mix should be used in testing and treatment, but it is more practicable to use mixes of the types described. Actually, in the case of grasses, most allergists believe that timothy pollen in itself contains sufficient common antigen for testing and treatment of patients sensitive to other grasses, so that timothy pollen extract can, if desired, be used in place of a grass pollen mix.

Most of the allergenic extracts that will be needed are listed in the standard medical supply catalogue. The medical officer may wish to order certain additional nonstandard items such as mixes of tree, grass, or weed pollens, or if he prefers he can make his own mixtures in the manner described in standard textbooks of allergy, using 1 ml each of various related antigens.

The extracts may be furnished in any of the commonly used strengths shown in table 2, i. e., as milligrams of total nitrogen, protein nitrogen units (PNU), or dilution of weight by volume, and proper labeling and identification is mandatory. Extracts should be refrigerated constantly but never frozen. Their refrigerator shelf life usually is about one year from date of manufacture.

## METHODS OF TESTING

Both scratch testing and intradermal testing are widely used. Where a complete survey involving a large number of tests is

TABLE 1 Summary of important pollens by geographic regions

Geographic area	Spring	Summer	Fall
Eastern half of United States	Trees Ash Beech Birch Elm Oak	Hickory Poplar or cottonwood Walnut Pecan	Grasses Timothy Orchard June or Kentucky blue Redtop
Western Plains states	Trees Ash Birch Elm Oak Hickory Sycamore	Bermuda Johnson English plantain Sorrel	Ragweed family Giant ragweed Dwarf ragweed Cocklebur
		Grasses Timothy June or Kentucky blue Orchard Redtop English plantain	Chenopoda Russian thistle Burning bush Lamb's quarter Pigweed Ragweed family Giant ragweed Dwarf ragweed Western ragweed Cocklebur Burweed marsh elder Falsed ragweed Wormwoods or sage

TABLE 1 Summary of important pollens by geographic regions—Continued

Geographic area	Spring	Summer	Fall
Southwestern states	<p>Trees Ash Poplar or cottonwood Willow Pecan Mountain cedar Mesquite</p>	<p>Grasses Bermuda Johnson Sudan Redtop</p>	<p>Ragweed family Burweed marsh elder Chenopods Russian thistle Burning bush Palmer's amaranth</p>
Pacific states	<p>Trees Alder Oak Cottonwood Walnut Plane tree or western sycamore</p>	<p>Grasses Orchard June or Kentucky blue Rye or wild rye Velvet Bermuda</p>	<p>Ragweed family Western ragweed False ragweed Artemisia genus Sagebrush Mugwort Chenopods Red root pigweed Russian thistle</p>
<p>North of Ohio River South of Ohio River From five to seven varieties Only in Central and Southern Texas Only in Western Texas</p>			

# POTENTIAL INTELLIGENCE TESTING

## A Case Study

ALVIN R MAHRER *First Lieutenant MSC USAR*

FROM both a clinical and a theoretical point of view, it is useful to distinguish between a measured intelligence score (I Q) and some "potential" score that a patient is presumed capable of obtaining. A recent article<sup>1</sup> proposed general principles which related a learning theory description of potential intelligence to certain specific problems in clinical psychology (*viz* dimensions of intelligence the growth of intelligence the meaning and measurement of mental deficiency the evaluation of the extent and nature of psychological interference and psychotherapy). Clinical hypotheses may be derived from these principles.

This article illustrates how the obtaining of an index of potential intelligence level makes it possible to develop clinical hypotheses regarding an individual case. The resulting hypotheses are clinical inferences about the patient rather than precisely stated experimentally verifiable hypotheses. As a preface to the case report a brief summary is given of a learning theory approach to potential intelligence and some methods of measurement.

### LEARNING THEORY APPROACH TO POTENTIAL INTELLIGENCE

It is presumed that based on an individual's previous experiences a number of answers to any single intelligence test question are possible. Each possible answer is termed a *behavior* within the framework of Rotter's<sup>2</sup> social learning theory each possible answer (behavior) may be described in terms of *behavior potential*. This is defined as "the potentiality of any behavior's occurring in any given situation or situations as calculated in relation to any single reinforcement or set of reinforcements."

In any given testing situation there is presumed to be a set of behaviors (possible answers) for each question and the be-

behaviors in any single set vary in behavior potential from high (with the greatest relative potentiality for being verbalized) to low (with low potentiality for being verbalized). Each set of behaviors has one behavior (answer) with the highest potential. Taken together, these behaviors may be said to be at the first *level of behavior*. The behaviors with the next highest behavior potential in each set are said to be at the second level of behavior, and so on for succeeding levels of behavior. A "lower" level of behavior is lower in availability, accessibility, and potentiality for being verbalized.

It should be noted that the term levels of behavior refers to a continuum of decreasing behavior potential. The differences between levels of behavior may be slight or great. The lower the level of behavior, the lower is the potential of behaviors at that level relative to those of other levels.

The standard method of administering and scoring elicits a single answer to a single question, in other words, it bases the I Q score on the first level of behavior. Although the Wechsler Bellevue test provides for alternative "equally good" responses and responses of varying quality, the examinee is asked to give one response to each question. The I Q score calculated in this manner is termed the *standard intelligence* score and is obtained by following Wechsler's manual for Wechsler Bellevue, Forms I and II.<sup>1</sup> In contrast, scoring may be based upon the *set* of behaviors to each question or, in other words, upon all levels of behavior (all possible answers). This is termed the *potential intelligence* score.

#### SOME METHODS OF MEASURING POTENTIAL INTELLIGENCE

A method of measuring potential intelligence has been derived from the learning approach.<sup>2</sup> This method answers the general question, "What I Q score is the patient capable of attaining?" Two other methods were used with the present patient. Wechsler's deterioration index<sup>3</sup> asks a more pointed question, "What was the patient's I Q score before deterioration, impairment, or decline?" Jastak<sup>4</sup> proposed a method of estimating "altitude" intelligence, which is presumed to be related to native endowment. Whiteman<sup>5</sup> further refined this method for clinical use. These three methods were used in the case reported.

The potential intelligence method elicits a set of behaviors (answers) for each item in the following Wechsler Bellevue verbal subtests: information, comprehension, arithmetic, similarities, and vocabulary. Scoring is based on the most correct answer among the set of answers to each question. The technique of po-

tential intelligence testing is also applicable to nonverbal behavior. However, the specific performance subtests of the Wechsler Bellevue were excluded because of the large role played by speed of response and the grasping of an over all principle.

Following the standard administration (based upon level of behavior 1), the patient is encouraged to give additional answers to each incorrectly answered question. After the patient gives a set of additional answers to the missed item, the examiner proceeds to the next missed item and so on through the test. If a more correct answer is included among these additional answers, potential intelligence scoring is based upon that more correct answer rather than the first incorrect answer.

Wechsler's deterioration index is based upon a comparison of the sum of Wechsler Bellevue subtest scores which hold and those which "don't hold" with deterioration, impairment or decline. According to Whitman's refinement of Jastak's method for measuring intellectual altitude, the equivalent of 10 subtests is obtained by multiplying the highest subtest by 5, the second highest by 3, and the third highest by 2. The I Q score thus calculated is a measure of intellectual altitude.

### CASE REPORT

A 21 year old unmarried white serviceman was referred to the psychology service because of amnesia, perplexity, auditory hallucinations, ideas of reference, mild delusions of persecution, bizarre activity, confusion, and illogical thinking. The final diagnosis was schizophrenic reaction.

On the standard Wechsler Bellevue Intelligence Test, the patient's full scale I Q was 47, the performance scale I Q was 43, and the verbal scale I Q was 59. Weighted scores for five verbal subtests are given in the top row (level of behavior 1) of table 1.

The levels of behavior 2 through 6 refer to the five additional answers given to questions incorrectly answered under the standard administration. With these potential intelligence data, the following clinical hypotheses may be drawn:

### DISCUSSION

#### Probable Intelligence Level Before the Onset of Symptoms

It is useful to estimate whether the present standard verbal scale I Q score of 59 represents the patient's probable level of functioning before the onset of symptoms, or in other words, if he functioned in the mentally deficient range before the onset of symptoms. One clue to this presumptom level is the potential I Q. If this is also in the mentally deficient range, the hypothesis

is that the presymptom level was also in the deficient range. Another clue is the potential I Q score at the second or third levels of behavior. The hypothesis here is that if these potential I Q scores are so "available," they probably represent a fair estimate as to the presymptom intelligence level.

TABLE 1 *Standard and potential weighted scores on five Wechsler Bellevue verbal subtests*

Level of behavior	Information	Comprehension	Arithmetic	Similarities	Vocabulary	Verbal I Q
1	4	2	3	3	2	59
2	5	4	6	11	5	80
3	8	7	9	11	7	94
4	9	7	9	13	7	97
5	10	8	9	13	8	101
6	10	9	9	13	9	104

In this case, the potential I Q at level of behavior 6 was 104. Potential I Q's at levels of behavior 2 and 3 were 80 and 94 respectively. The hypothesis then is that this patient's I Q of 59 is probably not representative of his presymptom level of functioning, and that his presymptom level was probably in the dull normal to average range.

### The Nature of Potential Intelligence

An important step in intelligence test analysis is the investigation of the profile of high and low scores. One general principle, stated as an hypothesis, is that the "kind" of intelligence varies with different levels of behavior. Applied to a single protocol, the hypothesis is that there is no necessary relationship between the relative scores of the subtests at different levels of behavior, the "high's" of one level may be the "low's" at another. The profile of skills and abilities at one level may be quite different from that at another level, an analysis of subtests at level of behavior 1 gives little information about the skills and abilities at lower levels.

Under standard intelligence testing (level of behavior 1), only 2 points separate the "high" (information) from the "lows" (comprehension, vocabulary). Under potential intelligence testing, a new "high" subtest emerges (similarities), and the "lows" change moderately (comprehension, arithmetic, and vocabulary), with 4 points now separating the "highs" and the "lows." The clinical hypotheses are that (1) the profile of subtest scores at



lower levels of behavior differs moderately from the profile at level of behavior 1 (2) there is greater variability of subtest scores and presumably skills and abilities, at lower levels of behavior, and (3) whatever skills, abilities, and personality structure are tapped by the similarities subtest appear to be "available" and potentially high, but unexpressed at the present time

### The Mentally Deficient Classification

Two kinds of mentally deficient classifications were supported<sup>1</sup> One classification was reserved for those who are functioning at a defined low level and whose potential intelligence score also falls within the deficient class The other classification is for those whose standard I Q is below the deficiency point but whose potential intelligence rises above that point The criterion for placing an individual in either classification is the potential intelligence score

The potential intelligence score of the patient discussed rose above the mentally deficient range at level of behavior 2 (I Q 80) and scores at lower levels of behavior increased appreciably beyond the I Q of 80 Therefore, the clinical hypothesis is that although this patient is presently functioning in a mentally deficient range he is not a "true" defective in that a higher level of intellectual functioning is "available" and he probably did not function in the mentally deficient range in the past

### The Prediction of Behavior

An important use of intelligence tests is to help in the prediction of a patient's response to a variety of situations In the experimental laboratory these situations may include both simple and complex learning tasks In the clinical setting these situations may include long or short term psychotherapy, the learning of language skills social skills the development of mechanical skills retraining re education and many other situations where the intelligence level presumably plays some part The general hypothesis here is that other factors being equal with patients of similar standard I Q the response to such learning situations will correspond to the potential intelligence scores

This patient's potential intelligence score at levels of behavior 2 (I Q 80) and 6 (I Q 104) suggest that there are available responses at the dull normal or possibly normal level In comparison with patients of identical standard I Q (59) but lower potential I Q this patient would probably respond "better" to learning situations

### Potential Intelligence Native Endowment and Impairment

If a deterioration index is calculated from the data of table 1, the prorated "hold" sum is 53, and the "don't hold" sum is 6. This yields a questionable deterioration loss of -10 per cent, suggesting that no deterioration loss has occurred. The deterioration index may actually be a spurious measure with these data because it was calculated on the basis of only 5 of the 10 subtests suggested by Wechsler.

Jastak's intellectual altitude may be calculated using White man's weighting system. If this weighting system is applied to five verbal subtests, presumably the three highest scores are multiplied by  $2\frac{1}{2}$ ,  $1\frac{1}{2}$ , and 1, respectively. This yields a "native endowment" or "intellectual altitude" verbal I Q of 63. However, as with the deterioration index, these results may be spurious inasmuch as they are based on 5 subtests rather than 10, and because a questionable weighting system was used.

Nevertheless, these three measures offer apparently conflicting clinical hypotheses. Potential intelligence testing suggests that the patient is functioning from 21 to 45 I Q points below either a previous level or some theoretically potential level. In contrast, the deterioration index suggests no deterioration loss, and Jastak's method implies that the I Q score of 59 stands in relation to an "intellectual altitude" or "native endowment" I Q of 63. Such contradictory clinical hypotheses would seem to call for research to explain the differences. This case seems to demonstrate the impropriety of using the three measures interchangeably. Additional indexes of the potential intelligence level might include educational level, school grades, previous intelligence tests, and similar criteria.

### Evaluation of the Extent of Interference

One hypothesis is that the amount of interference is proportional to the amount of increase of potential over standard I Q. In the case reported, the difference of 45 I Q points must be interpreted in relation to norms. A study of 60 neuropsychiatric patients at this hospital resulted in a mean difference of potential I Q over standard I Q, of 16 I Q points, with a standard deviation of 7 points. On the basis of these limited norms, it appears that relatively high interference is present in this patient.

Another hypothesis is that the lower the level of behavior at which the potential I Q reaches a maximum and begins leveling off, the greater the interference. Until systematic norms are available, interpretation must rely on more personal and nebulous clinical experience. It appears that the leveling off of potential

1 Q's occurred between levels of behavior 3 to 6 and that the largest differences occur between levels of behavior 1 and 2 or 3. This implies that a higher level of functioning (in the dull normal or low average range) is moderately accessible or available. Tentatively, this hypothesis further suggests that in a broad sense prognosis is moderately favorable.

### Evaluating the Nature of the Interference

The evaluation of the nature of the interference may be guided by the hypotheses that behaviors of higher potential (at higher levels of behavior) than the correct behavior provide information on the nature of interfering factors. The nature of these factors may vary with each level of behavior. What is commonly accepted as a "correct" answer may not be elicited because of the greater relative potential of other answers. The following clinical hypotheses attempt to assess what factors may be operating to elicit these other answers.

At the first level of behavior there were suggestions of passive aggression (e.g. spontaneous comments such as "You've got me. Why are you asking me these things? I'm no genius how should I know? I don't know. I ain't no shoe man" to comprehension item 5) of impulsivity (e.g. "Run" to comprehension item 2) and a perseverative stimulus repetition (e.g. to vocabulary items 2, 6, 10, and 11, respectively. "A donkey means a donkey. fur means fur. bacon means bacon. nail means nail" to information item 11. "Brazil is in Brazil").

The second level of behavior also reflected passive aggression and impulsiveness, but the perseverative stimulus repetition was not found nor did it appear again at lower levels of behavior. However new factors appeared. These included impotence (e.g. to information items 10, 12, and 13 and to similarities items 6 and 7. "I used to know. I can't think the way I used to. Seems like I should know that. I feel like I can't think.") and a fear of punishment (e.g. comprehension items 3 and 8 respectively. "I'd get in trouble and really get it. Otherwise they'd be punished").

The fourth level of behavior was characterized also by passive aggression and impulsivity but feelings of impotence and the fear of punishment were expanded to include general avoidance behaviors (e.g. arithmetic item 9. "I just don't want to think", vocabulary item 8. "That word scares me. I don't know why. similarities item 10. "I don't understand anything the words don't seem right").

Levels of behavior 5 and 6 reflected fewer signs of interference. However this level reflected more direct aggression (e.g.

"How the hell should I know"      n habous corpus is a murdered guy      Hara kiri is like brass knuckles      ") and personalized associations (e.g., similarities 10 "A poem and a statue they tried to learn me", comprehension item 7 "If I was lost I'd tear all the trees apart", vocabulary items 23 and 25 "A vesper is a stick to keep kids in line      recede means getting drunk and never coming home")

It appears that major interferences include passive aggression and impulsivity at nearly all levels, and a perseverative stimulus repetition at level of behavior 1. Feelings of impotence and a fear of punishment appeared at levels 2 and 3. Generalized avoidance behaviors appeared at level 4, and levels 5 and 6 were comparatively free of interference except for some direct aggression and personalized associations. It seems that different levels of behavior give rise to characteristic kinds of interference.

### SUMMARY AND CONCLUSIONS

A patient was reported whose measured (standard) Wechsler Bellevue Intelligence Scale I Q scores were verbal, 59, performance, 43, and full scale I Q, 47, all scores falling in the mentally deficient classification. A learning theory approach to the concept of "potential intelligence" was summarized, and some methods of measuring potential intelligence briefly described. The purpose of the report was to illustrate how obtaining an index of potential intelligence offered the following clinical hypotheses:

- 1 The patient's verbal I Q of 59 probably is not representative of his earlier, presymptom level of functioning.
- 2 He probably functioned earlier at the dull normal or average range.
- 3 At lower levels of behavior (i.e., "latent" or "less available") he shows a greater variability of skills and abilities.
- 4 Whatever skills and abilities are tapped by the similarities subtest appear to be "available" and potentially high, but unexpressed at present.
- 5 Although this patient is presently functioning in the mentally deficient range, he is not a true defective in that a higher level of intellectual functioning is "available," and he probably did not function in the mentally deficient range in the past.
- 6 Responses to learning situations are available at a dull normal or possible normal level. In comparison with patients of identical standard I Q but lower potential I Q, this patient would respond "better" to learning situations.

7 The deterioration index, the measurement of intellectual attitude" and the potential intelligence score seem to give rise to different clinical hypotheses

8 A high degree of interference seems to be operating

9 A higher level of intellectual functioning (in the dull normal or average range) is moderately accessible or available

10 Major interfering factors at all levels include impulsivity and passive aggression. A perseverative stimulus repetition is observable. At intermediate levels of behavior new interfering factors appear: feelings of impotence, a fear of punishment and generalized avoidance behaviors. Still lower levels of behavior give rise to direct aggression and personalized associations as interferences.

This case illustrated how clinical hypotheses regarding a single patient may be derived from some general principles. Further research is needed to test the usefulness of potential intelligence analysis by testing clinical hypotheses which can be obtained by such an analysis.

---

ACKNOWLEDGMENT The author expresses his thanks to Captain Lyle Wharton MSC USA, Capt. Irwin Sternalich MSC USA, 1st Lieutenant Robert Nichols MSC USA and Miss Maureen Moffett for their assistance.

#### REFERENCES

- 1 Mahrer A R. Potential intelligence level: the very approach to description and clinical implication. To be published in *J. Gen. Psychol.*
- 2 Rott R J B. *Social Learning and Clinical Psychology*. Prentice-Hall Inc. New York N Y 1954 p 105.
- 3 Wechsler D. *The Measurement of Adult Intelligence*. 3d edition. Williams and Wilkins Co. Baltimore Md 1944.
- 4 Jastak J. Plausible objective measurement of character. *J. Clin. Psychol.* 4: 170-178 Apr 1948.
- 5 Whittemore M. Attitudes: reference point in social analysis. *J. Clin. Psychol.* 6: 160-164 Apr 1950.



## Clinicopathologic Conference

U S Air Force Hospital, Lackland Air Force Base, Tex \*

### HYPERTENSION AND HEMATEMESIS

**Summary of Clinical History** A 40 year old, fairly well developed white man was admitted to the hospital on 16 January 1952 with a chief complaint of pain along the lateral aspect of the right thigh since 15 November 1951, following a skin graft from the right thigh to the left ankle for a burn of the left ankle. The patient had been known to have hypertension for the previous five years, but it had never been evaluated. Three months prior to admission he noted headaches, blurred vision, spots before the eyes, mild exertional dyspnea, weakness, and intermittent disorientation. Six days prior to admission he had shortness of breath on exertion lasting five minutes, accompanied by a regular type of palpitation. He denied dyspnea at rest, orthopnea, wheezing, asthma, chest pains, and pedal edema. The patient had a slight nonproductive cough of two weeks' duration, but denied having hemoptysis. The only urinary symptom was nocturia, two times per night.

Eight months prior to admission, the patient had occasional vague abdominal pain. A gastro intestinal series at that time revealed no abnormalities. Otherwise, his past history was negative.

---

Col James G Moore USAF (MC) Commander From the Medical Service Capt Lee S Monroe USAF (MC) Chief

His father died at age 65 with "kidney trouble" and his mother died at age 73 with "high blood pressure." Four siblings were living and well. There was no known history of diabetes, cancer, tuberculosis, or lung or blood disease in his family.

**Physical Examination.** The patient was a slightly emaciated man appearing 15 years older than his stated age of 40 years. Blood pressure was 240/170 mm Hg, temperature 98°F, pulse 80/min.

Funduscopic examination revealed some increase in light reflex of the arterioles with definite A/V nicking and one patch of white exudate in the right retina. Disk margins were sharp. The trachea was in the midline. The chest was slightly increased in posteroanterior diameter. The cardiac rate and rhythm were regular. The pulmonic second sound equaled the aortic second sound. In the sitting position there was a harsh early systolic grade 2 apical murmur; this was less intense in the recumbent position. The lungs were clear to percussion and auscultation, but breath sounds were slightly distant. The abdomen was concave, soft, and nontender. No masses or viscera were palpable. No costovertebral angle tenderness was present. Examination of the peripheral vessels revealed no evidence of sclerosis or varicosities, and no peripheral edema was present. The skin was clear and slightly dry.

Neurologic examination revealed cranial nerves to be grossly intact; there was no marked deviation from normal in reflexes. All modalities of peripheral sensation were intact and equal bilaterally. Vasomotor lability was demonstrated by marked cold hyperhidrosis.

**Laboratory Studies.** Hemoglobin was 14 g/100 ml, hematocrit 48 ml/100 ml, erythrocyte sedimentation rate 31 mm/hour, and white blood cell count 9,400/ $\mu$ l, with a normal differential count. Bleeding time was 5 minutes, 50 seconds; coagulation time 5 minutes, 5 seconds. The VDRL test was negative. Urinalysis was normal except for 2+ albumin; urine concentration test showed a specific gravity of 1.020 with volume of 260 ml; phenolsulfonphthalein test showed 55 per cent dye excretion in 50 minutes. Blood chemistry was as follows: uric acid 2.8 mg/100 ml, plasma lipid phosphorus 13 mg/100 ml, nonprotein nitrogen 40 mg/100 ml and 33 mg/100 ml, glucose (fasting), 97 mg/100 ml, total cholesterol 245 mg/100 ml, serum sodium 147 meq/l, serum chloride 105 meq/l, serum potassium 4.4 meq/l, total serum protein 6.7 g/100 ml. Vital capacity was 97 per cent of normal. Piperoxan hydrochloride test with 17 mg of Benodaine Hydrochloride: initial blood pressure 195/145 mm Hg, final blood pressure 220/160 mm Hg; hyperventilation test, initial blood pressure 220/110 mm Hg, final blood pressure 210/160 mm Hg.

On 18 January, an intravenous pyelogram showed a normal excretory pattern in both kidneys, pelvis and calyces were normal. A roentgenogram of the chest showed a fracture of the 9th rib posteriorly on the left and of the 9th and 10th ribs posteriorly on the right, but these did not appear to be recent. There was a calcified lesion in the 7th interspace on the right surrounded by a zone of reaction. The heart was within normal limits.

An electrocardiogram on 30 January showed an abnormal pattern in RS T and T waves, which probably represented coronary insufficiency superimposed on left ventricular hypertrophy.

**Course in Hospital.** The patient was placed on a Brompton's diet, after it was established that good kidney function was present. The blood pressure dropped to 180/110 mm Hg on medical treatment. On 8 February, a sympathectomy was done on the right side, from D 5 to L-2, and the patient did well postoperatively. The blood pressure came down to 140/95 mm Hg, but gradually rose again so that by March it was ranging from 200/175 to 120/100 mm Hg. Laboratory studies during this postoperative period showed that the hemoglobin was 12 g/100 ml, hematocrit, 39 ml/100 ml, erythrocyte sedimentation rate, 35 mm/hour, and leukocyte count, 7,300/ $\mu$ l, with 70 per cent neutrophils, 20 per cent lymphocytes, 6 per cent eosinophils, and 4 per cent monocytes. Bleeding time was 2 minutes, 15 seconds, coagulation time, 5 minutes. Urinalyses were negative. Total protein was 6.06 g/100 ml (albumin, 4.48 g/100 ml, globulin, 1.58 g/100 ml), and albumin globulin ratio, 2.83.

Roentgenograms of the chest from 10 to 27 February showed the following. On 10 February a pneumothorax space overlying the right upper lung field was present. There was also some postoperative reaction about the left lower lung field. On 12 February there was some decrease in the pneumothorax space on the right, and the right lower lobe still appeared to be collapsed. Fluid was present in the right side of the chest. On 19 February the previously described collapse of the right lower lobe was more posterior in the chest, and most likely was an empyema along the paravertebral gutter. Fluid from the retropleural space was negative on smear and culture. A lateral study showed some depression of the right middle lobe fissure, some partial atelectasis possibly was present in the right upper lobe. On 27 February obliteration of the pneumothorax space on the right had occurred, leaving some residual pleural thickening. The left lung was clear.

An electrocardiogram on 9 February again showed left ventricular hypertrophy. The RS T wave depression in  $V_1$  and  $V_2$  had



increased, and possibly represented myocardial subendocardial ischemia.

On 4 March, a sympathectomy was done on the left side, from D 4 to D 12. Convalescence was satisfactory. Postoperatively on 4 March the erythrocyte count was 4 920 000/ $\mu$ l, hemoglobin 12.5 g/100 ml and hematocrit 41 ml/100 ml. The urine was normal. Postoperatively the blood pressure ranged from 135/78 to 125/72 mm Hg. A roentgenogram on 5 March revealed clear lung fields and no pneumothorax; one on 10 March showed a pneumothorax over the left upper lung field. Continued absorption of the retropleural fluid on the right had occurred.

On 15 March the hemoglobin was 13 g/100 ml, and blood pressure was 168/90 mm Hg. However, the next day the patient vomited bloody fluid and the gastric contents were positive for blood. The hemoglobin dropped to 5 g/100 ml and the erythrocyte count to 1 260 000/ $\mu$ l. The total serum protein was 6.1 g/100 ml (albumin 4.0 g/100 ml, globulin 2.1 g/100 ml) with an albumin-globulin ratio of 1.9. Despite repeated transfusions—from one to three daily—hemoglobin remained at from 5 to 7 g/100 ml. Blood pressure dropped to an average of 110/76 mm Hg.

A roentgenogram of the chest on 17 March showed considerable reduction in the amount of pleural fluid over the left lung field; however, some fluid remained at the left base. Continuing diminution in the amount of retropleural fluid on the right was noted.

On 18 March the patient had a syncopal attack when he arose to go to the bathroom. He was sweating profusely, appeared weak and complained of chest pain on the left side. Blood pressure was 80/0 mm Hg, pulse 100/minute and respirations 26/minute. Physical examination at that time revealed breath sounds present throughout the lungs with no marked hyperresonance and no evidence of cardiac shift.

On 19 March laboratory studies showed that the hemoglobin was 5 g/100 ml, erythrocyte count, 1 720 000/ $\mu$ l, leukocyte count 16 200/ $\mu$ l with 87 per cent neutrophils, 5 per cent lymphocytes, 4 per cent stab cells and 4 per cent monocytes. The urine was yellow, clear and acid with a specific gravity of 1.010 and was negative for albumin, sugar and acetone. Microscopically there were 2 white blood cells per high power field. The electrocardiogram remained abnormal, however, since the previous tracing the RST and T waves in aVF and left precordium had returned to a more normal configuration.

On 20 March blood pressure ranged around 70/0 mm Hg; pulse was 150/minute and of weak quality. The patient had no pain but complained of "fullness in the stomach" and weakness and

was perspiring profusely. He remained afebrile. Physical examination at 0330 hours revealed a cold, clammy skin, and palpation of the abdomen revealed periodic rushes of peristalsis with associated nausea. By 0500 blood pressure had risen to 110/70 mm Hg and pulse had dropped to 122/minute.

At 2400 on 21 March, the patient went into deep shock and was given blood transfusions, Neo Symphrino Hydrochloride (brand of phenylephrine hydrochloride), and positive pressure oxygen to no avail. The patient died at 0520 on 22 March.

### DISCUSSION

Doctor Abbot: The electrocardiogram showed left ventricular hypertrophy. After his work up it was believed that the man had a malignant or premalignant type of essential hypertension, and he was prepared for sympathectomy. He was put on a Kempner's rice diet and his blood pressure came down somewhat. He had a two stage thoracolumbar sympathectomy, the first from D 5 through L 2, on 8 February. He had what I would assume to be the usual postoperative course with some fluid in his chest and some pain. His blood pressure fell transiently and then returned to more or less preoperative levels. He had a similar operation on the other side on 4 March, about a month later, and his immediate postoperative course was again relatively uncomplicated. His blood pressure came down to normotensive levels and remained there. Electrocardiograms taken during these postoperative periods were said to show changes consistent with myocardial ischemia. According to the nurse's notes, he complained of anterior chest pain at times. It is hard to evaluate chest pain in someone who has had extensive procedures of this type, however, and I don't know that you can attach any significance to it. In any case, the electrocardiograms didn't show signs of recent myocardial infarction.

He first began to vomit dark brown material on 15 March. Not too much stress was laid on that fact. He was nauseated from time to time and complained of some abdominal pain, but this wasn't a frequent complaint and he complained more of chest pain than of the other things. On 16 March he vomited at least 1,000 ml and probably a little more of coffee ground like material. His hemoglobin dropped dramatically—from 13 g/100 ml on the 15th, which would be the first day he began to vomit coffee ground material, to 5 g/100 ml on the 16th—and thereafter it never was normal, although he got several transfusions. Whenever he got up he would have profuse sweating, a rapid pulse, and syncope. He complained of anterior chest pain rather acutely on 17 March and also of pain in his stomach. However, over the next two days he felt better. On 21 March, seven days after he first began to vomit coffee ground material, he had stools described as tarry and red. He went into

---

Capt. Frank K. Abbot, USAF (MC), Assistant Chief Medical Service

syncope with a blood pressure of 80/0 mm Hg. In spite of Neo-Cy nephrine Hydrochloride and blood transfusions he died fairly promptly.

Interestingly enough, gastro-intestinal bleeding after a neurosurgical procedure is not a rare thing. Most of these procedures are ones that involve the brain in one way or another and have been thought in the series that I have seen to be concerned with the specific production of perhaps vagal stimulation along the lines Cushing first laid down causing peptic ulceration. I don't believe that this particular case falls into this category at all. I think we have to look back and think more seriously about his previous history of gastro-intestinal symptoms eight months earlier. These were vague stomach pains of such a degree that a gastro-intestinal series was done. What does one gastro-intestinal series mean? We all know that sometimes quite large significant lesions can be missed on one gastro-intestinal series.

Statistically, the most probable lesion would be a duodenal ulcer however. Of lesions causing bleeding or pain that is the easiest to demonstrate by x ray examination. Gastric ulcer is a possibility. Gastric cancer is a possibility. Hiatus hernia could certainly be present and missed. It could be missed on two or three gastro-intestinal series and to be found after the fluoroscopist thinks about it and tries very hard to find it by various maneuvers of the gastro-intestinal series. Hold that in mind and then try to consider what has happened here. With a bilateral sympathectomy there is sensory denervation of the upper gastro-intestinal tract. Some of the men who began doing splanchnicectomies and more extensive sympathectomy procedures found early that people who had duodenal ulcers didn't get better although they stopped having pain. The ulcers got worse and there are numbers of cases of perforation and perforation in the postoperative period without pain. There are also on record a gradually accumulating series of cases of patients who have not had pre-existing gastro-intestinal complaints but who in a period following either extensive operative procedures or a severe illness will have ulceration and bleeding in the gastro-intestinal tract and this has been thought of as an adaptation breakdown type of disease. Curling's ulcer may be this type of thing and certainly rather extensive erosive mucosal lesions have been found in the esophagus, stomach, duodenum, small bowel and even large bowel in this type of case. That however is certainly more rare.

To my mind the important thing in this case is that a patient after sympathectomy can have a serious bleeding lesion in the gastro-intestinal tract which can be missed. I think that what killed this man was probably a peptic ulcer most likely in the duodenum. Hiatus hernia might be considered as a second choice and with this type of stress gastro-intestinal erosion as a poor third.

Something else found by physiologists is an increase in gastric motility and probably of acid secretion after sympathectomy. This

plus the stress of the operation, activated the ulcer, causing it to bleed. The bleeding was somewhat masked by the syncope which occurs after a bilateral sympathectomy. Not enough significance was laid to it and the patient had no pain to localize it. In the terminal situation I think he was in irreversible shock. I think it is highly likely that he had myocardial ischemia. He may even have had myocardial infarction precipitated by shock for arteriosclerosis is usually considerable in people who are hypertensive.

Doctor Ginsberg: My feeling about the hypertension in this patient is that it was adequately studied and that the patient had hypertensive cardiovascular disease for which sympathectomy is justifiable. The effects of the sympathectomy on this patient's subsequent course would in my mind be in effect this. He had a denervated upper abdomen at least. His left sympathectomy was incomplete but this is routinely done by many surgeons in an attempt to prevent impotence in a male. We can at least say that he was partially denervated as far as abdominal visceral sensation was concerned, but probably not high enough to denervate his coronary blood supply, so that if he had had a severe coronary thrombosis we probably would have known about it. The phenolsulfonphthalein test was 55 per cent in 50 minutes, so we can document good kidney function even in the presence of such severe hypertensive disease that sympathectomy was justified.

The review of the possible sources of the bleeding is entirely consistent with my own opinions. The only other possibility in my mind is that this man's hypertension, his initial finding and his subsequent hemorrhage were due to some disease of the major blood vessels with a vascular enteric fistula. We have to my mind evidence of something occurring in the upper retroperitoneal or lower retropleural or mediastinal area. This possibility is further suggested by palpable pulses on examination, plus the pain that was the man's initial complaint. He had pain in the anterior part of the thigh which suggests the possibility of occlusive disease of the terminal aorta—perhaps aneurysm with rupture. That is the reason I went into some detail about how much bleeding from this man's gastro-intestinal tract had occurred. It is very unlikely that despite multiple transfusions a man can bleed enough to reduce his hemoglobin from 13 to 5 g/100 ml without losing more blood through his colon. I would say that this suggests that he may have been depositing a considerable part of it in his retroperitoneal area or mediastinum. Therefore in my differential diagnosis I would say that the first likelihood would be peptic ulceration—either in the duodenum or stomach or perhaps in the esophagus. Certainly an occult carcinoma of the stomach, diaphragmatic hernia, or severe gastritis could have caused the hemorrhage. Then there are such exotic disorders as lymphosarcoma of the gastro-intestinal tract and occult carcinoma

of the colon and I would like to include in my differential diagnosis aneurysmal rupture of a major blood vessel probably the aorta

Dr. Abbot's diagnoses

- 1 Peptic ulcer in duodenum
- 2 Myocardial infarction
- 3 Arteriosclerosis

Dr. Ginsberg's diagnoses

- 1 Hypertensive cardiovascular disease
- 2 Peptic ulceration in duodenum, stomach, or esophagus
- 3 Ruptured abdominal aortic aneurysm

#### PATHOLOGIC FINDINGS

Doctor Schoffer: This 110 pound somewhat emaciated man had well healed scars in both flanks and a stab wound in the left chest for drainage purposes. When the abdomen was opened the liver was approximately 7 cm below the costal margin. The stomach was markedly dilated. The left side of the chest had some fibrous adhesions and a thick layer of fibrin around the pleural surfaces particularly in the left lower lobe. The right side of the chest had a hematoma in it as was noticed on the x rays and it contained approximately 250 ml of old clotted blood.

The heart weighed 459 grams. The coronary arteries showed very severe arteriosclerosis and very marked narrowing of the lumina particularly of the right coronary which had practically a complete occlusion grossly. Microscopically there were a few recanalized channels through an old organized thrombus. The left anterior descending and left circumflex arteries showed very severe narrowing. There was a 1.5-cm fibrous scar on the apex. In the anterior portion of the septum there was a 2 cm area of discoloration. Microscopically this area showed a few polymorphonuclear leukocytes and lymphocytes scattered between the fibers. The fibers showed evidence of early acute degenerative change. There was loss of striations with beginning hyalinization and some of the nuclei were beginning to fade out.

The aorta showed very little atherosclerosis with only a few plaques scattered throughout and practically no calcification. No aneurysm was found.

The lungs were somewhat heavy. The right weighed 560 grams the left 665 grams. The lower lobes on both sides had some increased firmness suggestive of mild pneumonia. There were fibrous and fibrous adhesions noted on both sides.

The liver weighed 2,000 grams which is very sizable. There was a somewhat accentuated lobular architecture. Microscopically there

as central lobular congestion and mild lymphocytic infiltration in the portal areas

The kidneys were of normal size, the capsules stripped easily and the surfaces were fairly smooth. Microscopically, there was mild arteriosclerosis.

The brain had a normal architecture throughout except in the right temporal lobe where there was a 2 by 3 cm area of old hemorrhage with old dark, somewhat clotted blood.

The gastro-intestinal tract was filled throughout with large quantities of clotted and fluid blood. The stomach contained 3 000 ml of clotted and fluid blood. There was a 9 cm ulceration on the posterior wall of the stomach in the prepyloric area, the edges were slightly raised. In the base of the ulcer there was a 3 mm artery whose lumen was open and projecting into the base of the ulcer. This was dissected out and found to be the right gastropyloric artery. Microscopically there was considerable collagenous scarring in the base of the ulcer. The small intestine contained large quantities of dark red blood. The large bowel contained black, thick pasty material.

In summary this was a hypertensive middle-aged man who had had a bilateral sympathectomy. Postoperatively a chronic ulcer broke down, and further ulceration penetrated his gastropyloric artery, causing him to bleed to death. Along with that he had severe atherosclerosis and coronary insufficiency which with anemia and shock led to early myocardial infarction. He had a small hemorrhage in his brain that produced transient symptoms.

#### Pathologic diagnoses

- 1 Hypertension
- 2 Chronic gastric ulcer of prepyloric area, with penetration of gastropyloric artery
- 3 Atherosclerosis and coronary insufficiency
- 4 Myocardial infarction
- 5 Intracerebral hemorrhage

Doctor Monroe: The problem of whether to do a sympathectomy upon a hypertensive patient is at this time I believe, in a different category than it was when this operation was performed. Now we have certain medications, namely the derivatives of rauwolfia—the reserpine that was isolated by CIBA—and our ganglionic blockers as demonstrated by Ansofysen Tartrate (brand of pentolinum tartrate) which perform a medical sympathectomy rather efficiently, thus we are able to handle a case of even malignant hypertension probably as adequately as the surgeon. This is no criticism of course, as these drugs were not on hand at the time this procedure was done. At the present time I cannot think of any patient with essential hypertension whom I would refer for sympathectomy. I realize that there is a great deal of opinion to the

contrary but certainly I believe that as we accumulate data on these drugs sympathectomy will fall into disuse

Doctor Tyson There are a few comments I would like to make with reference to the management of both hypertension and upper gastrointestinal bleeding First of all a sympathectomy an extensive sympathectomy for hypertension was first done a little over 20 years ago Several years ago it was quite popular in the treatment of hypertension especially in those cases that did not respond favorably to medical management Hypertension has been classified roughly in four groups In group 1 are patients with mild hypertension who can be treated very satisfactorily medically In groups 2 and 3 are patients who do not respond to medical management I feel that three or four years ago a sympathectomy was indicated for these patients In group 4 are those patients with a fixed blood pressure especially those with kidney damage and a high nonprotein nitrogen I think a sympathectomy for the patients in group 4 was in most instances contraindicated Thus the patient would most probably fall into group 2 or perhaps in group 3 So I feel definitely that in 1952 the sympathectomy on this patient was in order

It has been emphasized that ulcers sometimes appear to be worse following sympathectomy Three or four years ago the Mayo Clinic reported a series of about 900 cases of thoracolumbar sympathectomy In 20 of these ulcer symptoms were manifested in the early postoperative period About 17 of these had had previous ulcer symptoms The authors could not conclude that this was significant and they could not draw any definite conclusions that sympathectomies do make ulcers worse but it seems to be the general consensus that such is the case In my limited experience I have had occasion to see two patients bleed from ulcers following sympathectomy As far as the results of sympathectomy for hypertension are concerned it is difficult to find any statistics to go by but after five years approximately 60 per cent of the patients in group 2 and about 20 per cent of the patients in group 3 have a significant reduction in blood pressure I believe most authorities agree that the survival time of these patients is probably increased by sympathectomy As Doctor Monroe has mentioned within the past three years newer drugs have been developed which are very effective I personally haven't seen a sympathectomy done in three years and don't care to do them I think that for the most part it is a poor way of treating hypertension Another surgical method of treating hypertension is adrenalectomy Experimental work has been done on this problem in a good many places I personally at the University of Tennessee operated on a number of dogs in which experimental hypertension was produced using Goldblatt's clamp Total adrenalectomy was then performed and the dogs maintained on cortisone We found that we could

keep the blood pressure down for many months sometimes more or less permanently, by this method. Subtotal and total adrenalectomy have been advocated in some centers for rapidly progressive cases of malignant hypertension. Doctor Bowers<sup>2</sup> at the Veterans Administration Hospital in Memphis has done a number of subtotal adrenalectomies on patients with severe malignant hypertension and seems pretty enthusiastic about it. It does seem to prolong life and to alleviate the symptoms in patients who survive the procedure.

Curiously enough following sympathectomy many patients will feel better subjectively. Their headaches, dizziness, chest pain, shortness of breath, and other symptoms of hypertension will often regress even though the blood pressure may go back up after a few weeks or months. Another fact that might be mentioned is that following sympathectomy those patients who have previously been resistant to medical treatment seem to respond better to medical treatment.

#### REFERENCES

- 1 Hightower N C, Morlock C G and Craig W McK. Effect of sympathectomy on clinical course of peptic ulcers. *Proc Staff Meet Mayo Clin.* 25: 634-638 Nov 8 1950.
  - 2 Bowers R F. Personal communication.
-



## SERVICE ARTICLES

# EFFECTS OF SEDATION ON AIRBORNE PSYCHIATRIC PATIENTS

FRANKLIN H. ERNST JR. M.D.

**P**SYCHIATRIC patients often present management problems in flight, and if they become assaultive can be sources of danger to the other occupants of an aircraft. The flight nurse frequently wonders whether or not certain of the patients should be resedated if so at what stage. In order to determine what our sedation was doing for the large numbers of closed-wing psychiatric patients being flown out of this base to formulate criteria for resedation and to compare the relative merits of amobarbital and phenobarbital, a study was carried out during the 12 months ending on 30 April 1953. It was thought that perhaps the effects of sedation might be improved by changing the medication from 0.4 gram of amobarbital sodium by mouth to 0.3 gram of phenobarbital sodium in glycerin intramuscularly.

All patients evacuated by air from the Pacific area and many of those from Alaska were routed through this base on their way to military hospitals on the eastern seaboard. Patients studied were those classified either as 1A needing both sedation and restraint, or as 1B needing either sedation or restraint, when airborne. In practice, this hospital routinely sent even 1B's in a chemically and physically restrained condition.

### METHOD

Every other patient to be transported by air was given amobarbital sodium by mouth and the alternates received phenobarbital sodium intramuscularly, in the dosages mentioned. Three patients who would not take amobarbital orally received 0.5 gram of the aqueous preparation intravenously.

Questionnaires were attached to the flight tag of each patient stating (1) name (2) medication prescribed and (3) time administered. The flight nurse was asked to describe the sedative effect on the patient during the trip, report the amount, type, and time of any resedation required, sign her name, and return the tag to this base.

---

From U. S. Air Force Hospital, Tyndall Air Force Base, Calif. Dr. Ernst is now at 408 Tennessee St., Vallejo, Calif.

## RESULTS

Of the 1,219 questionnaires sent out with sedated patients for whom there were complete medical records, 625 (51.3 per cent) were returned. Of these, 329 pertained to patients who had received amobarbital and 296 to those sedated with phenobarbital. The duration of flight for 460 of the patients was from 8 to 12 hours and for 152 was from 4 to 6 hours. For 14 it was only about 2 hours.

In going over the individual reports, there seemed to be three broad categories into which the responses fell. The effect of medication was such that during the trip the patient presented (1) no nursing problem, (2) some problems, or (3) serious problems. The first group were quiet and cooperative, and were either asleep or dozing at intervals. A few slept or were sedated throughout the flight. The second group were restless, talkative, agitated, boisterous, or sullen and withdrawn, but in any case could be reasoned with. The third group presented serious and even dangerous problems, being hallucinated, overactive, unsalvageable, or suicidal.

As shown in table 1, there was a slight though not statistically significant difference in the response of patients sedated before flight with phenobarbital sodium as compared with those sedated with amobarbital sodium. With phenobarbital, 85.6 per cent were no problem and 11.5 per cent presented minor problems, with amobarbital, the percentages were 90.6 and 7.0, respectively.

TABLE 1 Percentage of patients presenting nursing problems after sedation with amobarbital sodium (A) or phenobarbital sodium (P) by length of flight

Response to medication	Length of flight (hours)						Total of all flights		Total combined A or P
	2		4-6		8-12				
	A	P	A	P	A	P	A	P	
No problem	100.0	40.0	91.4	87.9	87.9	85.3	90.6	85.8	88.1
Slight problem		40.0	7.5	10.4	7.0	11.1	7.0	11.5	9.1
Serious problem		20.0	1.1	1.7	3.1	2.6	2.4	3.9	2.8
Total number	6	8	12	12	12	12	12	12	6

after phenobarbital would be an advantage in the event of ditching on an overwater flight. In such case, the amount of drowsiness present and the degree of reality orientation of patients would be of importance, and phenobarbital did leave a larger percentage of patients alert than did amobarbital (49 per cent versus 33 per cent).

It can be seen from table 1 that taking both groups together, more than 88 per cent of the patients were no problem whatsoever to the flight nurse, while 9 per cent caused some trouble and between 2 and 3 per cent presented serious problems in management. The 9 per cent of patients who presented minor nursing problems because of being agitated, apprehensive or boisterous were the group with which expert handling could produce the most benefit by keeping them from becoming more active thereby preventing trauma to these restrained patients under the stress of flying.

The 2 to 3 per cent of patients who posed serious nursing problems are presented in more detail in table 2. Out of 623 closed ward psychiatric patients only 16 (1 in 39) became an important nursing problem on board an aircraft. Of these, there were 6 (1 in 104) who were assaultive combative or suicidal and therefore physically dangerous to themselves or other patients or members of the crew. Each of these 6 patients had a previous history of similar difficulties. None of the small number of patients on 2 hour flights showed this dangerous response but on 4 to 6-hour flights it was 1 in 152 and on 8 to 12 hour flights 1 in 92 (5 in 460).

TABLE 2 Breakdown of serious nursing problem group of patients

Response to medication	Length of flight (hours)						Total of flights	
	2		4-6		8-12			
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Hallucinated, overstimulated	1	7.6			6	1.3	7	1.1
Resistive, profane			1	0.7	2	0.4	3	0.5
Assaultive, suicidal			1	0.7	5	1.1	6	1.0
Number of patients	13		152		460		625	

Sedation was mainly limited to long flights. On those lasting 8 to 12 hours 39 of 460 patients (1 in 12) were resedated whereas none of the 13 patients on 2 hour flights received additional sedation and only 4 patients in 152 (1 in 38) on 4 to 6-hour

flights received it. The 17 patients who were re-sedated in spite of presenting no nursing problem had either complained of body aches or were awake during the long trip and asked for more sedation. The remaining 26 needed it for various psychiatric reasons, 9 being serious management problems and 17 presenting minor nursing problems (table 3).

TABLE 3 Number of patients re-sedated

Nursing problem	4-6 hour flights				8-12 hour flights			
	Amobarbital		Phenobarbital		Amobarbital		Phenobarbital	
	Number	Number re-sedated	Number	Number re-sedated	Number	Number re-sedated	Number	Number re-sedated
None	86	2	51	1	204	8	201	6
Some	7		6		16	7	26	10
Serious	1		1	1	7	5	6	3
Total	94	2	58	2	227	20	233	19

It appears that on a long flight, if a patient has a history on the flight tag of assaultiveness, re-sedation should be seriously considered about 3 to 4 hours after the initial medication was given. Flight nurses might properly have little fear of over-sedating by the intramuscular route on overactive patients. Re-sedation can be considered as early as 2 hours after the initial medication is given, especially if the patient is *well hydrated*. However, it should be borne in mind that *dehydrated* patients may accumulate the intramuscular medication in their tissues without its being picked up by the circulation and having an observable effect until many hours later, when it might be overwhelming in amount.

### SUMMARY

No statistically significant difference was observed between the sedative effect of oral amobarbital on 329 airborne psychiatric patients and that of intramuscular phenobarbital on 296 patients.

Of the two groups combined, only 2.6 per cent posed serious management problems and only 1.0 per cent were assaultive or suicidal. The percentage of patients presenting serious nursing problems increased with length of flight.

Re-sedation should be seriously considered on any long flight for a patient with a history of assaultiveness.

# PREVENTIVE DENTISTRY IN THE U S AIR FORCE

FRANCIS J SAMAHA *Major USAF (DC)*

**T**HE SIGNIFICANCE of preventive measures in dentistry, as in medicine and industry, cannot be overemphasized.<sup>1</sup> The Air Force dental service is dedicated to the preservation of dental and oral health by the prevention and treatment of dental and oral diseases and injuries among military personnel. For effectiveness, prevention must be foremost in the mission. Inductees are in the age group having the highest rate of dental caries and requiring extensive oral rehabilitation.<sup>2,3</sup> The military, with its organization and records system, affords an excellent opportunity for establishing a closely monitored dental program which permits instruction in oral hygiene and effective follow through in the maintenance of oral health.

## PREVENTIVE DENTISTRY PROGRAM

A plan designed by the dental service of the United States Air Force (Section G AFM 160 13) was put into effect in October 1952 to supplement the oral rehabilitation services of modern dentistry.<sup>4,5</sup> As developed at this Air Force base the plan includes both education and prophylaxis.

### Education

Dental health lectures employing illustrative clinical color slides are presented to all base units annually with the new Air Force training films entitled "Preventive Dentistry" planned for showing. Descriptive literature and personal instructions on proper oral hygiene are given to patients during their oral prophylaxis treatment. New posters developed locally are displayed at intervals in prominent locations throughout the base. The educational material used in this program was developed according to the criteria for acceptability set forth by the American Dental Association<sup>6</sup> which state that it (1) must be authentic, (2) must meet existing needs, (3) must be effective in promoting dental health and (4) must be suitable for various age groups and intellectual levels.

---

From U S Air Force Hospital Bergstrom Air Force Base Tex. Dr Samaha now  
Tufts University School of Dental Medicine Boston Mass.

### Oral Prophylaxis

One of the primary objectives of the Air Force Preventive Dentistry Program is to accomplish at least one annual oral prophylaxis on all personnel. This in effect means that about 9 per cent of the men at each base must receive oral prophylaxis each month. This is accomplished by the following procedures:

1. All persons appearing on dental sick call who have not had an annual prophylaxis are immediately given an appointment.

2. A review of the A F Form 309 (Dental Health Records) is made periodically for more effective control of this annual requirement.

### DIAGNOSIS AND TREATMENT

Early diagnosis and treatment are essential elements in a preventive dentistry program. It is important to note that many of those persons who have requested a dental examination have asymptomatic gingival or periodontal disease and/or carious lesions of which they were unaware.

When diagnosis has been established, the dental status of military personnel is determined by the official dental classification system of the Department of Defense. This dental classification system is outlined as follows:

*Class 1* Individuals requiring no dental treatment.

*Class 2* Individuals requiring routine but not early treatment of such conditions as (a) moderate dental calculus, (b) prosthetic conditions not included in class 4, (c) caries (not extensive or advanced), (d) periodontal diseases (not extensive or advanced), and (e) those requiring corrective or preventive measures.

*Class 3* Individuals requiring early treatment of such conditions as (a) extensive or advanced caries, (b) extensive or advanced periodontal diseases, (c) pulpal or apical infection, (d) chronic oral infections, (e) heavy dental calculus, and (f) those requiring removal of one or more teeth or other surgical procedures not included in class 5.

*Class 4* Individuals requiring essential prosthetic appliances, including (a) those with insufficient teeth to masticate the service ration, and (b) others in need of an appliance essential to their duty.

*Class 5* Individuals requiring emergency dental treatment for such conditions as (a) injuries, and (b) acute oral infections (acute parietal and periapical abscesses, Vincent's infection, acute gingivitis, acute stomatitis, et cetera).

The following factors have been important in the implementation of the Preventive Dentistry Program at this base

1 An adequate professional staff is of paramount importance. The average staff ratio at this base during 1955 and until June 1956 was 1.9 dental officers per 1 000 military personnel. This compares favorably with the staffing ratio requirement of 3.9 dental officers per 1 000 military personnel.

2 Equally important is the base regulation regarding dental appointments, so that continuity of service can be maintained. By adhering to this regulation broken appointments have been reduced and the cooperation of base personnel has improved.

3 Continuous surveys are in progress to recognize those patients who are neglecting dental health requirements.

### EFFECTS OF PROGRAM

In order to assess the effects of the Preventive Dentistry Program the dental health status of personnel at this Air Force base for the years 1955 and 1956 were compared with that of the entire Air Force prior to initiation of the program in 1952 (table 1). The figures for Bergstrom in 1952 were not available. Percentages are expressed in terms of the official dental classification system. Before the Preventive Dentistry Program became

TABLE 1 Comparison of dental health status of U S Air Force in 1952 before the oral prophylaxis program, with that of Bergstrom Air Force Base in 1955 and 1956

Group	Year (calendar)	Accumulated oral prophylaxis per month (percentage)	Percentage strength in dental classes				
			1	2	3	4	5
U S Air Force	1952	2.8	34.6	32.9	28.8	2.7	1.0
Bergstrom Air Force Base	1955	8.2	60.9	23.1	13.5	2.5	0.0
	1956 (June)	9.3	65.8	19.6	13.5	1.1	0.0

effective only about a third of Air Force wide personnel were receiving oral prophylaxis each year. At this base in 1955 and the first half of 1956 all military personnel received at least one oral prophylaxis per year. The indication is that implementation of the program leads to a definite increase in the number of men in class 1 and a corresponding decrease in the number in classes 2 through 5.

To further test the program's effectiveness, a careful screening of the 4,319 base dental health records was accomplished. Of these, 1,456 were eliminated because an annual examination was not recorded. On the basis of the dental classification system, the findings of initial examination in 1,079 men, annual examination in 1,723 men, and discharge examination in 61 men were compared. As noted in table 2, there was a 30 per cent increase in class 1 on annual examination as compared with the initial examination, and an additional increase of 31 per cent on discharge, with a corresponding improvement in the other classes.

TABLE 2 Dental classification of personnel at Bergstrom Air Force Base on initial annual and discharge examinations

Group examined	Number of cases	Per cent strength in dental class			
		1	2	3	4
Initially	1 079	23	35	40	2
Annually	1 723	53	30	15	2
On discharge	61	84	15	1	0

The two groups—those examined initially and those examined annually—were compared for the incidence of caries, extractions, and periodontal disease. It was found that the annual group averaged 1.1 dental cavities per man, while the group examined initially averaged 2.4 cavities. Despite the fact that there were 644 more men in the annual group than in the initial group, there were 58 fewer cases of periodontal disease and 225 fewer extractions in the annual group than in the initial group.

### FLUORIDATION OF DRINKING WATER

Today, fluoridation of drinking water is recognized as an effective advance in preventive dentistry. Its practical worth has been adequately demonstrated.<sup>9</sup> However, despite its impressive benefits it is only one of those weapons to be used against oral diseases. All known preventive measures must be employed as parts of a fully organized program.

Official figures of the United States Public Health Service as of September 1956 show that about 1,400 communities in the United States, with a total population of over 30 million, receive the benefit of fluoridated drinking water.<sup>10</sup> Fluoridation is providing constant benefit to those millions.



tremendous reductions in dental caries among children and young adults

On the basis of pertinent research findings regarding the measure of protection for adult teeth the Committee on Dentistry of the National Research Council late in 1953 justified fluoridation at military installations.<sup>1</sup> Since that time, the Air Force has made rapid strides in developing policies, criteria, and program. To date, a total of 25 Air Force bases, including this base have had plans for fluoridation of their drinking water approved. Thus far four bases (not including Bergstrom at this writing) have implemented the program.

Since the Government bears heavy expenses in maintaining dental clinics, equipment, supplies, and professional staffs, the cost of dental care is of great concern.<sup>2,3</sup> It has been stated that the "Department of Defense spends about \$100 million annually for the dental care of military personnel and uses the services of nearly 8,000 dentists in the Armed Forces."<sup>4</sup> However, because of the great potential existing in preventive programs, it will be understood why considerable emphasis is placed on the Air Force Preventive Dentistry Program by the Office of The Surgeon General.

The future for preventive dentistry looks bright. Active preventive dentistry and oral research programs should bring new hope for better control of oral diseases through more effective methods of prevention of those conditions that now afflict almost every person.

#### REFERENCES

- 1 Ogl, D. C. Preventive medicine in armed services. *U S Armed Forces* 4, 1: 6-8, 1953.
- 2 Elwell, K. R. Preventive dentistry program. *U S Air Force plan*. *U S Armed Forces M J* 4, 1463-1467, Oct 1953.
- 3 Preventive dentistry. *U S Air Force Medical Service Digest* 5, 20-22, Dec 1954.
- 4 Preventive dentistry. *Dental News Bulletin*, Office of the Surgeon General Headquarters, *U S Air Force*, Oct 1952, pp 3-6.
- 5 Dental Administration and Technical Procedures. AFM 160-13, Department of the Air Force, Feb 1955, pp 61-62.
- 6 Preventive dentistry. *Dental News Bulletin*, Office of the Surgeon General Headquarters, *U S Air Force*, Feb 1955, pp 3-6.
- 7 Manpower Programming. Medical support. *U S Air Force Medical Service Digest* 7, 9, July 1956.
- 8 Dental health of Air Force. *U S Air Force Medical Service Digest* 5, 2, 9, Dec 1954.
- 9 Dean, H. T. Dental research and preventive dentistry. *J New Jersey Dent Soc* 2, 21-26, Sept 1955.
- 10 U S Department of Health, Education and Welfare. Advance press release HEW E10, 28 Oct 1956. U S Department of Health, Education and Welfare. Public Health Service, Washington, D. C.
- 11 Lyons, H. Dimensions of dental health problem. *Oral Hyg* 46, 718-720, June 1956.



were made between growth in media inoculated in the field and in media inoculated in the laboratory later from the same water sample

Accordingly, a coliform kit was devised consisting of 10 six dram (23 by 88 mm) screw capped vials for media and a 250 ml, glass stoppered sample bottle. Five milliliters of a 3% strength lactose broth were placed in five vials, and 5 ml of a 3% strength lauryl tryptose broth were out into the other five vials. The two media were used to see if one would be more efficient for detecting coliform organisms. For chlorinated waters a small amount of sodium thiosulfate was added to the sample bottles. Vials and sample bottles were sterilized by standard methods. Vials were calibrated with a scratch mark at the 15 ml level to facilitate the addition of 10 ml of the sample to the 5 ml of media. The vials were placed in one mailing carton and the sample bottle in another.

An instruction and data sheet was enclosed in each kit with the request that the sample be taken a short time prior to shipping. During cold weather especially if freezing was likely, note was added requesting that the inoculated vials be left overnight in a warm room to encourage bacterial growth before shipping. Upon receipt in the laboratory vials of media showing adequate growth were subjected to the confirmatory test. Those vials which were clear or showed slight turbidity were incubated at 35° to 37°C overnight. If no growth was then evident they were discarded as negative. The remaining portion of the water sample which was returned unrefrigerated with the vials was examined by the standard laboratory test using lactose broth.

Over a period of approximately three years, a total of 907 coliform kits were sent or taken into the field and 169 were returned. Samples were received in the laboratory during all months of the year except March and May, most of them being shipped during the summer and fall.

The area covered in the sampling included the northern and western Alaskan coasts, St. Lawrence Island, lower Foul Bay River (southwestern) and the interior and south central region. Approximately 65 per cent of the samples were from surface supplies.

The inoculation of the media vials in the field was usually accomplished within an hour after collection of the sample. The interval of time between the collection and the laboratory examination of the shipped water samples varied from 6 hours to 10 days with one interval of 14 days. The average time was 4.3 days. Ninety six (56.8 per cent) of the samples showed an

elapsed time of more than 3 days before they were examined in the laboratory

The evaluation of differences was based on the numbers of samples, vials, or tubes which were found to be positive for coliform bacteria. Significant findings were indicated where there were completely negative results on the one hand and positives on the other. No attempt was made to show differences in terms of Most Probable Numbers (MPN).

### RESULTS AND DISCUSSION

Of the 169 samples examined, 96 (56.8 per cent) were positive for coliform bacteria. Samples positive and negative for coliform bacteria by the two procedures are shown in table 1.

TABLE 1 *Results of field and laboratory procedures*

Samples		Results of procedures	
Number	Per cent	Field	Laboratory
73	43.2	-	-
68	40.2	+	+
27	16.0	+	-
1	0.6	-	+

The most noteworthy point in this table is indicated by the 27 samples (16.0 per cent) which were positive by the field procedure but negative by the standard laboratory procedure. According to the latter test, these water samples would have been classified as potable, when actually they were not. There had been either a complete die off of coliform organisms, or a reduction in numbers to the extent that they could not be detected in the shipped samples by the laboratory technique employed. By contrast, the field procedure failed to show these organisms in only one sample (0.6 per cent) in which the laboratory procedure demonstrated their presence.

A comparison of the productivity of the two media inoculated in parallel in the field showed that differences were, for the most part, not significant. Of 95 samples positive for coliform bacteria, 94 (98.9 per cent) were positive in lactose broth, while 89 (93.7 per cent) were positive in lauryl tryptose broth. However, the total number of confirmed lauryl tryptose broth vials exceeded those of the lactose broth by approximately 3.3 per cent.

The increased effectiveness of the procedure is dependent upon the initiation of coliform growth soon after collection of the sample. These organisms are capable of growing over a wide range of temperature, viz., 5° to 45°C, although there is some selectivity as to types which will grow at the extreme temperatures. The effects of non coliform overgrowth and antagonism would be less likely where coliform organisms have had a chance to develop before shipment. Furthermore, these effects could be lessened by using a selective medium such as lauryl tryptone broth.

By using five 10 ml portions of water per sample an estimation of coliform density can be obtained. Under the usual conditions of testing in the field a high degree of accuracy in enumeration is difficult to achieve.

### SUMMARY AND CONCLUSIONS

A simple and effective procedure for determining the potability of water supplies in the field is described. The inoculation of media in the field is a feasible procedure. It is applicable to the bacteriological examination of turbid waters such as often found in samples from surface supplies in rural Alaska. This procedure is believed to be especially adapted to those areas where an inordinate amount of time is required for the sample to reach the laboratory after collection. Furthermore this method gave considerably fewer false negative results than the standard test when performed on shipped, unrefrigerated water samples.

---

**ACKNOWLEDGMENT** The author is grateful to Mrs. Claress Allen and Mrs. Dorothea Swan for technical laboratory assistance.

### REFERENCES

- 1 American Public Health Association. American Water Works Association and Federation of Sewage & Industrial Wastes Association. *Standard Methods for the Examination of Water, Sewage and Industrial Wastes*, 10th edition. American Public Health Association, New York, N. Y., 1955, p. 372.
- 2 Ministry of Health (Britain). *The Bacteriological Examination of Water Supplies*. Reports on Public Health and Medical Subjects No. 71 (revised edition). His Majesty's Stationery Office, London, 1939 (Reprinted 1952), p. 3.
- 3 Gelman, E. E., Kabler, P. W., Jeter, H. L., and Clark, H. F. Deflection in membrane filter test for coliform bacteria in water. *Am. J. Pub. Health* 44: 1467-1474, Nov. 1955.
- 4 McCrady, M. H. Mailage-free method for long-distance bacteriological control of water supplies. *J. Am. Water Works Ass.* 7: 645-651, Nov. 1920.
- 5 Caldwell, E. L., and Parr, L. W. Present status of handling water samples: comparison of bacteriological analyses under varying temperature and holding conditions with special reference to direct method. *Am. J. Pub. Health* 23: 467-472, May 1933.
- 6 Weiss, J. E., and Hunter, C. A. Simplified bacteriological examination of water. *J. Am. Water Works Ass.* 31: 707-713, Apr. 1939.
- 7 Stuart, R. D. Transport problems in public health bacteriology: use of transport media and other devices to maintain viability of bacteria in specimen. *Canad. J. Pub. Health* 47: 114-122, Mar. 1956.

mann W L Dahljeim I McCurdy II Broitman S and Keteluk K Field  
termining the sanitary quality of rural water supplies Proceedings of the 56th  
eting of the Society of American Bacteriologists Apr 29 May 3 1956 *Bact*  
6 p 104

M C and Neill A H Use of membrane filter technique for testing water  
n field *Pub Health Rep* 71 1093 1096 Nov 1956

S Public Health Service Public Health Service drinking water standards  
*Health Rep* 61 371 384 Mar 15 1946

---

#### KNOW YOUR INDUSTRIAL SOLVENTS

The use of the so called industrial solvents is no longer confined to a plant or factory In various forms they are utilized in the home in the garden and on the farm Rarely are they harmful if handled judiciously A physician should be able to advise his patient what the preventive measures (careful handling) are He should likewise recognize the ear marks of any given intoxication if and when it occurs His treatment should be based upon his knowledge of the expected physiologic and pathologic reaction The physiologic classification of these solvents is therefore very important

—RUTHERFORD T JOHNSTONE M D  
in *Illinois Medical Journal*  
pp 301 302 Nov 1954

1 Below are some reasons given by others as being important as to why they are test pilots. We would like you to rank these as to importance in your case. Place a 1 before the factor you feel is most important, a 2 before the second most important item, a 3 before the third, and so on. Remember to rank them in terms of what is important to you. Your responses will be confidential so please be frank.

- diversified flying (all types or particular types)
- pay (including flight pay)
- prestige—recognition
- rank (chance of promotion)
- thrill (the danger involved)
- desire to conquer and explore unknown areas
- consider it a good stepping stone to a civilian job
- get out of previous unpleasant assignment

2 List three factors which you feel would have better qualified you for your present assignment.

3 Below is a scale indicating possible attitudes toward your assignment as a test pilot. Please place a check above the number that best describes your present feelings toward your assignment as a test pilot.

1	2	3	4	5
Very satisfied enthusiastic about present assignment	Satisfied but not enthusiastic	Indifferent to present assignment no strong feelings either way	Dislike present assignment but do not plan to request change	Strongly dislike present assignment would change if possible

4 Do you feel you are (more or less—circle appropriate word) satisfied with your assignment than the average Air Force Officer?

5 Do you plan to be a test pilot two years from today? Yes—  
No—

## RESULTS

The questionnaire results will be presented first and then amplified by the information obtained in the interview. The reasons for being a test pilot in question 1 were placed in the following order as to importance:

- 1 Diversified flying (all types or particular types)
- 2 Desire to explore and conquer unknown areas
- 3 Prestige—recognition
- 4 A good stepping stone to a civilian job

- 5 Thrill (the danger involved)
- 6 Rank (chance of a promotion)
- 7 Pay (including flight pay)
- 8 Got out of previous unpleasant assignment

Diversified flying was easily the most important reason for being a test pilot. Desire to conquer and explore unknown areas was given as the second most important factor, and prestige-recognition was third. Figure 1 presents the quantified score in graph form for each factor. The score was obtained by giving each 1 response a weight of 8, each 2 response a weight of 7, each 3 response a weight of 6, et cetera. Figure 1 indicates that the first three factors are clearly the most important reasons why these pilots requested test flying. The belief that the thrill and the danger involved are an important motive for becoming a test pilot is not supported by these results. Thrill is fifth in importance, no pilot checked it as either first or second in importance, and only two pilots rated it as third.

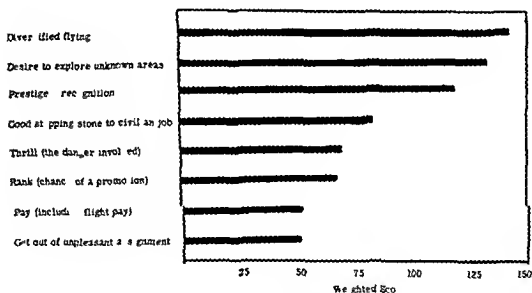


Figure 1 Motivation of test pilots.

On question 2 relating to prior experience, 18 of the 21 pilots completing the questionnaire stated that they believed more technical information and more formal schooling, especially in engineering, would have made them better qualified for test flying. Thirteen of the 21 thought that more diversified flying experience would have better qualified them for their present assignments. No other area approached this degree of unanimity.

Seventeen of the 21 pilots stated that they were highly satisfied and enthusiastic about their present assignment, 2 were satisfied, 1 was indifferent, and 1 disliked his assignment. All



but two believed they were more satisfied with their assignment than the average Air Force officer and all but one said they planned to be test pilots two years from today

These results indicate that as a group test pilots are highly satisfied with their present duties and plan to continue being test pilots as long as possible

### INTERVIEW FINDINGS AND DISCUSSION

The results of the interview strongly support the questionnaire finding that the persons in this group were highly satisfied with their duty as test pilots. The love of flying and the chance to fly different types of aircraft were found to be the primary motives and a feeling of accomplishment and of making a significant contribution to the Air Force a close second. Many thought that in peacetime this was the only assignment that offered a challenge and a feeling of self satisfaction. Prestige and recognition as in the questionnaire was about third in importance but interestingly the majority of those interviewed considered that this recognition often came from sources outside the Air Force. Also since desire for diversified flying is such a strong motivating force for becoming a test pilot any curtailment of this opportunity might result in some feelings of disappointment and could contribute to lowered morale.

From this limited sample it appears that there is no one type of personality or socioeducational background that is characteristic of most test pilots. As in other occupations test flying meets different personality needs for each individual. However the common conception of test pilots as carefree happy go lucky devil may care individuals applies only to a very small minority. A few such types seem to be present but they will probably become less numerous as the true scientific nature of the work base becomes more widely known. The test pilots studied at this base are cautious careful individuals whose approach to their task is similar to research workers in other areas. They conceived their mission as one of gathering reliable and accurate information and their behavior in the air and on the ground seems to be guided by this over all goal. The almost unanimous desire for more technical education supports this conception. Perhaps it would not be amiss to refer to them as research pilots rather than test pilots.

Of particular interest in these interviews were the pilots attitudes toward the dangers involved in supersonic flying of relatively unproven aircraft. None denied the existence of these dangers but all thought they would be able to anticipate and prevent mishaps. Of major importance here was their self con-

confidence and their feeling that they knew their aircraft well. The long hours spent studying mock ups and in briefings before actually flying the aircraft seem to greatly reduce the fears of the unknown. A few admitted this overconfidence in their ability might cause them to stay with the plane too long, but each believed he would be able to make the correct decision. Another factor which may cause the pilot to stay with the plane beyond the safe ejection point is the feeling of unreality. Because of their many hours of flying when they have always been able to "bring it back" and their extreme confidence in their own ability, the feeling that this "couldn't be happening to me" may delay the decision to eject beyond the critical point. Few believed they could eject at high speeds and survive, and all thought this factor also might cause them to stay a little longer in an endeavor to control the aircraft. All hoped for improvements in the technique of high speed ejection, most believing that "high speed ejection is something you have to live with today."

### FUTURE ASSIGNMENTS

Assignment after completing his tour at this base is something no test pilot anticipates with any eagerness. Most test pilots seem to consider that this is the top assignment of their career and that any other will be anticlimactic. The type of assignment given them after completing their present tour was often mentioned as the crucial factor as to whether or not they would remain in the Air Force. It seems it is at this point that the lure of civilian test flying may become most attractive.

Two suggestions were offered to prevent this loss of highly skilled personnel to the Air Force. Those with engineering training considered that the logical progression was (1) to project officer and then (2) to a weapons system project officer. Pilots who wanted to return to tactical operations suggested that they follow an aircraft through the test program and then into the field. They thought that they would then be in an excellent position to utilize the experience and knowledge gained during testing. All test pilots felt that the individual pilot should be consulted before any future assignments were made.

### SUMMARY

To study the attitudes and motivations of test pilots assigned to Flight Test Operations at this base, 12 pilots were interviewed and 21 completed an attitude motivation questionnaire. Results indicated that pilots become test pilots primarily because they love to fly, and because they feel they are accomplishing something worthwhile. Prestige and recognition are also important factors, but most test pilots believe this comes pri

marily from sources outside the Air Force. Technical information, engineering training, and diversified flying experience are listed as important prerequisites. The modern test pilot's approach to his work seems to be similar to that of research workers in other areas and the happy carefree devil may care individual seems to be the rare exception rather than the general rule. The term "research pilot" is suggested as a more descriptive term than "test pilot." As a group test pilots are highly confident of their flying ability. This self confidence and thorough knowledge of their duties seem to be important factors in overcoming the fear of the danger involved. For this sample of pilots, the dangers and unknowns of supersonic flight did not appear to pose a problem. Exploring these unknowns is an important motivating force. Most test pilots consider that this type of flight duty is the top Air Force assignment of their career and that any future assignment will be anticlimactic.

#### REFERENCES

- 1 Dempsey C A, Greiner T H, Burch N R, Chiles D and Steel J. Human factors in long range flight. *J Aviation Med.* 27: 18-22 Feb 1956.
- 2 Flickinger D. Crew efficiency in the B-52 strategic bomber: planning by human factors team. *J Aviation Med.* 26: 2-12 Feb 1955.
- 3 Gogge A P. Human factors in aircraft design. *Air Surgeons Bull.* 2: 298 1945.
- 4 Flickinger D (moderator). Sky unlimited panel discussion: an extreme speed and altitude. *J Aviation Med.* 26: 503-512 Dec 1955.

---

#### RESEARCH MONEY

A sharp increase in the volume of medical research and in the funds available for its support have been major developments of the past 10 years. Total national expenditures have increased from 75 million dollars in 1945 to about 240 million dollars in 1955. Each of the major contributors—philanthropy, endowment, industry, and government—increased its total contribution. This is important because diversity in source of support for research is vitally important. However, the increases have not been proportionate. At the present time government supports about half the medical research in this country and industry about a third. Funds from endowment and philanthropy have not increased at a rapid rate.

—JAMES A. SHANNON, M.D.  
in *Journal of American Medical Association*  
p 1030 Mar 24 1956

## Coarctation of the Aorta

With Resistance to Blackout From Acceleration Forces

HENRY A SCHLANG *Commander MC USN*  
ALAN L HASLUP *Lieutenant MC USNR*  
RUFUS J PEARSON Jr *Captain MC USN*

THE DIAGNOSIS of coarctation of the aorta has become so commonplace in large hospitals that a report of a single additional case requires more than the inherent interest in the disease to justify its publication. An aviator with an unusual feature of coarctation was seen recently at this hospital. While giving his history to a physician, the patient stated that he had consistently had an increased resistance to blacking out during flight maneuvers involving acceleration forces ordinarily considered sufficient to produce blackout. A relationship between this resistance and the coarctation warrants consideration of the possible mechanisms.

### CASE REPORT

A 23 year old Marine Corps aviator who had been retired because he had coarctation of the aorta was admitted to this hospital on 13 August 1956 for surgical correction of the coarctation. The past history revealed that in October 1953 when he received a physical examination for appointment to a commissioned grade a cardiac consultation had been obtained because of cardiac murmurs. Apparently the murmurs were considered not disqualifying because he was accepted for active duty. An electrocardiogram of 2 November 1953 had been reported as within normal limits. On 28 May 1954 a physical examination at a naval air station revealed a loud systolic murmur over the pulmonic valve and a soft diastolic murmur to the left of the sternum. Hypertension of moderate degree had been noted on several occasions in the 1953-1955 period.

There were no symptoms referable to the cardiovascular system except for tingling in the legs when the patient was nervous and precordial heaving of several months duration. Throughout his training and career as a Marine Corps aviator he had had an unusual resistance

---

From U S Naval Hospital, National Naval Medical Center, Bethesda, Md. Comdr Schlang is now assigned to U S Naval Hospital, St Albans, N Y.

to the blacking out effect of acceleration. The patient claimed that at no time during his flight training did he experience blacking out or graying out (loss of peripheral vision). In 1954 while training with AD-1 fighter bombers he made 192 practice bombing runs entailing 40° glide-bombing runs and 60° dive bombing runs. During none of these did he grayout or blackout. He stated that at one time or another during the practice bombing runs every man in his squadron except himself had experienced some degree of the retinal dysfunctions associated with high acceleration. He noted that during the runs he had been subjected to from 4.5 to 6.5 G. He recalled specifically that in 1955 during a dive bombing run from 10 000 feet he found himself in a dive with excess power and finding that his altitude was decreasing and his air speed increasing too rapidly he pulled out of the dive abruptly. During the pullout he noted that his accelerometer reached 7 G and that he actually passed the wing man who had been flying ahead of him in column formation. He grounded the aircraft for structural check after this experience in which again he had had no blackout or recognized grayout.

Physical examination revealed a well developed well nourished young white man who appeared healthy. The radial pulses were strong and the carotids were forceful. The femoral pulses were present but weak and lagged behind the radials. The abdominal aortic pulse was diminished. Dorsalis pedis pulses were present but weak. The blood pressure was 140/69 mm Hg in the right arm and 140/60 mm Hg in the left arm in the supine position with simultaneous readings. The upper extremity flush point was 110. The blood pressure in the left leg was 130/90 mm Hg and in the right leg 120/100 mm Hg. The lower extremity flush point was 90. There were no visible or palpable collateral arteries. The heart was essentially normal in size on percussion. A grade III systolic harsh blowing murmur was heard best in the third left intercostal space near the sternum but was transmitted to the precordium neck and back and was easily heard down the spine. A grade II diastolic blowing murmur was heard best in the fourth left intercostal space. The electrocardiogram was within normal limits. Fluoroscopy revealed slight enlargement of the left ventricle. A double indentation of the esophagus was seen with barium swallow. A roentgenogram showed minimal notching of the ribs. Operation revealed a coarctation with a 4 mm opening.

### DISCUSSION

That the occurrence of resistance to the effects of acceleration and the presence of coarctation of the aorta in this patient is more than coincidental is strongly suggested by the observations of Wood<sup>4</sup> and his associates at the Mayo Aero Medical Laboratory. They described a patient with coarctation of the aorta who showed a remarkable resistance to the effects of positive acceleration when tested in the human centrifuge.

The physics and experimental physiology of the retinal and cerebral ischemia which produces blackout and unconsciousness have been clearly presented by Wood and associates<sup>1</sup> and will only be touched on here. In the interest of orientation, a simplified diagram (fig 1) is used to show the relationships between the heart, brain, and retinas and the effect of acceleration in causing blackout and unconsciousness.

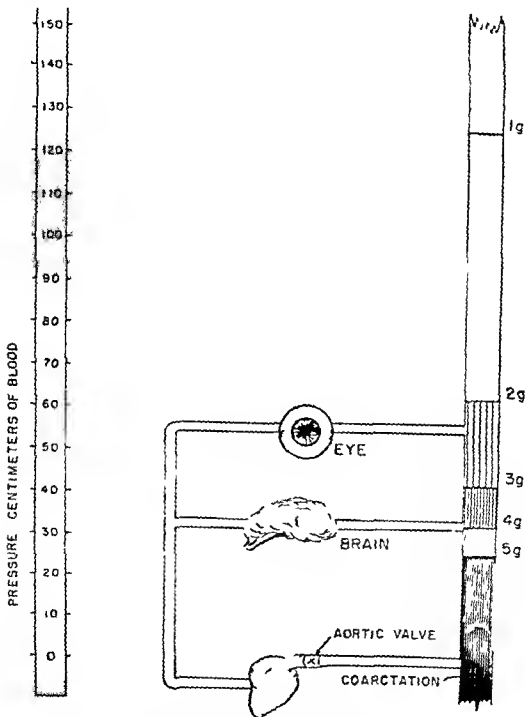


Figure 1 Levels of blood at various accelerations sup-  
 sure at heart level.

fixed pres

In the diagram the heart is represented as a pump operating at a constant pressure during the initial period of acceleration. This postulate has been experimentally demonstrated in centrifuge studies.<sup>4</sup> Circulation to the head is shown as a column of blood with outflows at cerebral and retinal levels. The dimensions in the figure are derived from the assumption that the mean blood pressure at the level of the heart is 95 mm Hg, which is equivalent to 125 cm of blood. The retina is indicated above the level of the brain to represent the intraocular tension of some 20 mm Hg, or 26 cm of blood, which must be overcome by the perfusing pressure. It is obvious that under normal conditions the height of blood in the column is more than adequate to perfuse both the retinas and the brain.

With the onset of acceleration each cubic centimeter of blood in the column increases in weight in direct proportion to the acceleration applied. It has already been established that, with the onset of acceleration and for a definite interval thereafter, the supporting pressure at the base of the column, i. e., the blood pressure at heart level, is constant. Further under ordinary conditions there would appear to be no obstruction to the immediate fall of the column which would occur as the weight of the column (and therefore its pressure at heart level) rose above the normal supporting pressure in the aorta at heart level. The distance the top of the column falls from its normal position is directly proportional to  $G$  so long as the blood pressure at the heart level is constant. For increasing values of applied  $G$  forces, the column of blood falls proportionately from its initial level as indicated in the figure.

It becomes plain in the figure that blackout must (as it does) occur before unconsciousness when acceleration increases. It is also evident that the height of the column of blood at any value of  $G$  is a function of the blood pressure at the heart level, so that rising blood pressure at heart level proportionally raises the height of the column at any value of  $G$ . This relationship is the crux of the problem of resistance to blackout, whether induced by an anti- $G$  suit or by coarctation of the aorta.

In coarctation the protective mechanisms might be ascribed to the frequent presence of hypertension above the level of the coarctation, to an unusually early and active response of the compensatory mechanisms which take place in acceleration,<sup>5</sup> or to the obstruction placed in a major pathway of retreat for the falling blood column under the influence of acceleration (fig. 1). The mechanism in this case is speculative and even in a case of coarctation studied in the centrifuge the available data do not clearly indicate the precise protective mechanism.<sup>1</sup>

## SUMMARY

An aviator with coarctation of the aorta seen recently at this hospital had increased resistance to the blacking out effect of acceleration. We have been able to find only one other report in the literature of this feature of coarctation. It is postulated that this resistance might be ascribed to the hypertension which exists above the level of coarctation.

## REFERENCES

- 1 Wood E H Personal communication
  - 2 Wood E H Lambert E H Baldes E J and Code C F Effects of acceleration in relation to aviation *Federation Proc* 5 327-344 Sept 1946.
- 

Every doctor has a set of fairly firm beliefs as to which illnesses are acceptable and which are not how much pain suffering fears and deprivations a patient should tolerate and when he has the right to ask for help or relief how much nuisance the patient is allowed to make of himself and to whom, etc etc. These beliefs are hardly ever stated explicitly but are nevertheless very strong. They compel the doctor to do his best to convert all his patients to accept his own standards and to be ill and to get well according to them.

—MICHAEL BALINT M D  
in *Lancet*  
p 684, Apr 2 1955



# Anterior Pituitary Insufficiency and Diabetes Mellitus

CHARLES B MOORE Lieutenant MC USNR

**D**IABETES mellitus in the presence of hyperfunction of the anterior pituitary has been fairly frequently reported but I have been able to find in the literature only 14 authentic cases of the concurrence of diabetes mellitus and spontaneous anterior pituitary insufficiency. This article presents the fifteenth recorded case of such a combination.

Although the incidence of the combination is not known the reported cases indicate that the diagnosis is being made with increasing frequency because (1) more tests are available to assay endocrine function properly and (2) more physicians now recognize the symptoms produced by anterior pituitary insufficiency. Thus of the previously reported cases of this syndrome six<sup>1</sup> appeared prior to 1930 and eight<sup>2-7</sup> since then. Autopsies were performed on the 11 patients who died usually soon after onset of anterior pituitary insufficiency. Of the surviving three one is reportedly doing well<sup>8</sup> one is receiving maintenance therapy and reportedly not doing well<sup>9</sup> and one is reported to be living without replacement therapy<sup>10</sup>.

Early diagnosis is essential and should be considered in any diabetic patient who suddenly requires less insulin or in whom insulin sensitivity develops. With proper replacement therapy and cautious medical care the patient may be returned to some form of productive life.

## CASE REPORT

A 35 year old white woman was admitted to this hospital on 17 March 1952 because of diarrhea and drowsiness of five days duration and some recent vomiting.

In November 1937 following a severe emotional upset malaise polydipsia polyphagia and loss of weight developed. Shortly after this a diagnosis of diabetes mellitus was made. The diabetes was well regulated in a hospital on a daily dosage of 20 units of protamine

<sup>1</sup>F. B. U. S. Naval Hospital, Naval Medical Center, Bethesda, Md. Dr. Moore  
<sup>2</sup>Al. Ochsner Medical Foundation, New Orleans, La.

Bethesda, Md. Dr. Moore

May 1957)

# CASE REPORTS—PITUITARY INSUFFICIENCY

731

zinc insulin and 8 units of regular insulin. This dosage controlled the diabetes for several years. The patient was admitted to the same hospital on 14 October 1940 with clinical manifestations of a urinary infection and moderately severe diabetic acidosis, both of which were successfully treated, and when the patient was discharged 11 days later the diabetes was well regulated on a daily dose of 30 units of protamine zinc insulin.

On 9 July 1941 the patient was admitted to the same hospital with diagnoses of controlled diabetes mellitus, pregnancy of 35 weeks' duration, and early toxemia of pregnancy. The blood pressure was 130/95 mm Hg. Mild edema of the ankles was present. Slight improvement followed care in the hospital and the patient was discharged two days later. She was readmitted because of increasing albuminuria and edema. On 25 July, because of diabetes mellitus and toxemia, a cesarean section was performed. Profuse bleeding occurred because the placenta was in the line of the incision. Despite a transfusion of 500 ml of whole blood during the operation the patient remained hypotensive for several days. Four days following cesarean section shock developed, the blood pressure remaining around 70/40 mm Hg for several hours. Response to intravenous infusion of dextrose and saline solutions was slow. The patient was discharged on 8 August, the diabetes was well regulated on 28 units of protamine zinc insulin daily.

During the next few years the patient began to note a gradual decrease in the amount of insulin required and increasing difficulty in maintaining stable control of the diabetes. By April 1944 the insulin requirement had decreased to 6 units of protamine zinc insulin daily and the patient ate freely except for mild carbohydrate restriction. Sometime during 1944 she also noted menstrual irregularity for the first time. Prior to this she had menstruated regularly since her pregnancy. Between 1944 and the spring of 1952 she had occasional scanty menstrual periods after which her menses ceased completely.

Following severe mumps in 1948 the patient's health gradually but continually became worse. During the next few years the insulin requirement remained about the same (4 to 6 units of protamine zinc insulin daily) (fig. 1). The patient had no further bouts of diabetic acidosis. Two weeks prior to admission to this hospital she had experienced a severe infection of the upper respiratory tract.

At the time of admission in April 1952 the diabetes required 5 units of protamine zinc insulin daily but the patient had taken none for the preceding five days allegedly because of the diarrhea. Physical examination upon admission revealed a thin, pale, dehydrated white woman appearing chronically ill. Her blood pressure was 106/80 mm Hg, pulse rate 74/min, respiration 18/min, and temperature 97°F. She weighed 93 pounds and was 5 feet 3 inches tall. Initial laboratory

tests revealed a blood sugar of 102 mg/100 ml glycosuria a leukocyte count of 3 900/ $\mu$ l and an erythrocyte count of 3 600 000/ $\mu$ l

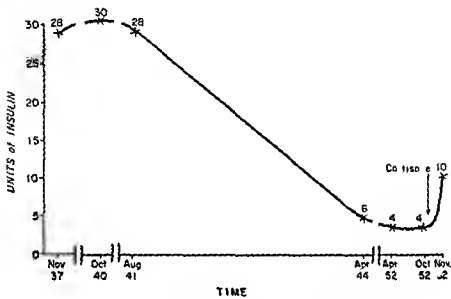


Figure 1 Diagrammatic representation of insulin requirement of patient over a period of 15 years

The patient was given 10 units of protamine zinc insulin upon admission. The same evening she became extremely pale, cold, and nauseated. She complained of difficulty in breathing and of a heaviness substernally. A few moments later she vomited 500 ml of gastric contents and complained of profound weakness. She continued to be cold and dry. An electrocardiogram was reported as suggesting electrolyte imbalance. Serum chloride was 73 mEq/l. Blood sugar was 52 mg/100 ml. The patient responded only lightly to an intravenous infusion of dextrose in water and Darrow's solution hypodermically.

The next morning she became nauseated and within profound insulin shock suddenly developed. This was followed by two generalized convulsions. During the next few days she gradually responded to supportive treatment but continued to be nauseated and ate little. Gastric intubation was necessary to maintain nutrition and after hydration anemia became apparent and required many blood transfusions.

A few days later another hypoglycemic reaction followed injection of 15 units of regular insulin which was given just before intravenous infusion of 1 000 ml of a 5 per cent solution of dextrose. When the infusion was started the blood sugar was 292 mg/100 ml and four hours later it was 46 mg/100 ml. The diarrhea improved rapidly with symptomatic therapy.

Ten days after admission, physical and roentgenographic evidence of right middle and lower lobe pneumonia developed. The pneumonia rapidly resolved following treatment with penicillin and the patient was discharged on a dosage of 4 units of protamine zinc insulin daily, to be followed in the outpatient clinic. A roentgenogram of the chest at this time revealed only slight residual infiltration in the right middle lobe.

During the next few months the patient continued to have a poor appetite, lost 22 pounds, was weak and had periodic bouts of nausea and vomiting. Moderate anemia, demonstrated at this time, failed to respond to the usual antianemic measures. In addition to loss of pubic and axillary hair the patient complained of loss of libido, cold intolerance and amenorrhea. These complaints, coupled with insulin sensitivity, suggested a diagnosis of anterior pituitary insufficiency.

The basal metabolic rate was reported to be in the hypothyroid range, although the exact values are not available. An  $I^{131}$  tracer study revealed an uptake by the thyroid gland in 48 hours of 4.8 per cent of the administered dose. Following a dose of 20 units of thyroid stimulating hormone daily for three days  $I^{131}$  was again administered on the fourth day. The 48 hour uptake by the thyroid gland then was 12.7 per cent of the administered dose.

The patient was therefore readmitted to this hospital on 6 October 1952 with a diagnosis of anterior pituitary insufficiency and diabetes mellitus. Physical examination revealed an undernourished cachectic white woman whose temperature was 98.6°F, pulse rate, 86/min and blood pressure, 86/68 mm Hg. Generalized wasting of the muscular and subcutaneous tissue was apparent. The hair on the head was dry and sparse and the axillary and pubic hair was considerably decreased. There was thinning of the lateral part of the eyebrows. The left pupil was smaller than the right and reacted sluggishly to light and accommodation. The tongue was slick. The breasts were atrophied. The skin was dry and had lost its normal turgor. The serum chloride was 95.8 mEq/l, serum sodium 133 mEq/l, serum potassium 4.4 mEq/l, red blood cell count, 4,200,000/ $\mu$ l, hemoglobin 12.5 g/100 ml, hematocrit 38 ml/100 ml, leukocyte count 4,850/ $\mu$ l with 2 per cent band forms, 42 per cent segmented polymorphonuclear leukocytes, 46 per cent lymphocytes, 5 per cent monocytes and 5 per cent eosinophils. Serologic test for syphilis was negative. Results of urinalysis were normal. The fasting blood sugar on admission was 72 mg/100 ml, but it varied between 63 mg/100 ml and 350 mg/100 ml while the patient was in the hospital. On 9 October the urinary neutral 17 ketosteroids were 0.9 mg/24 hours. The patient was given 25 mg of corticotropin (ACTH) every six hours for three days, and on the third day the urinary 17 ketosteroids were 2.6 mg/24 hours. On the following day they were 2.6 mg/24 hours. Following administration of 25 mg of ACTH the total

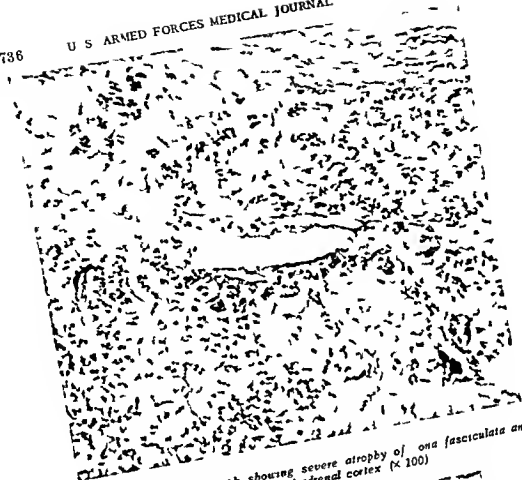


Figure 3 Photomicrograph showing severe atrophy of zona fasciculata and zona reticularis of adrenal cortex ( $\times 100$ )

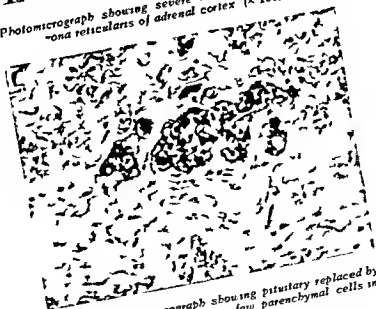


Figure 4 Photomicrograph showing pituitary replaced by fibrous tissue except for a few parenchymal cells in the center ( $\times 100$ )

pituitary appeared normal. The lobules of the breasts were small and widely separated by relatively acellular hyalinized connective tissue, which stained deeply with eosin. The endometrium of the uterus was thin and lined by low cuboidal cells. The glands showed little evidence of secretory activity. The thyroid follicles were small and lined by low cuboidal cells (fig. 5). The lumina of most contained pink staining colloid which varied from dark to light pink. The interstitial tissue was dense and a large portion was hyalinized. There was diffuse lymphocytic infiltration as well as lymph node formation within the stroma. Mitotic figures were frequently seen in the germinal centers of the lymphatic nodules. In the ovary the germinal epithelium was composed of the usual low cuboidal cells. In the dense stroma there were a very few growing follicles. Several graafian follicles were present. The pancreas appeared normal.

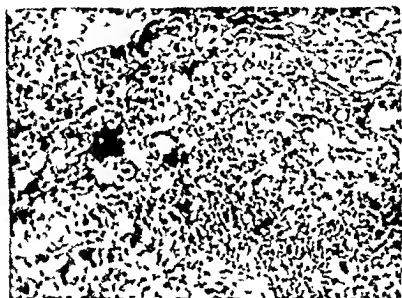


Figure 5 Photomicrograph of a section of the thyroid showing small follicles and dense hyalinized interstitial tissue ( $\times 100$ )

### DISCUSSION

In a recent review of the literature on the Houssey phenomenon, Harvey and de Klerk<sup>11</sup> summarized the 11 previously reported cases and added three of their own. As in patients with anterior pituitary insufficiency without diabetes mellitus, the clinical picture tends to vary from patient to patient, depending upon the target gland whose function is most greatly affected. The syndrome has occurred with equal frequency in males. In females the most common cause is pituitary necrosis. Other causes include anorexia nervosa, infections, and arteriosclerosis. In only a few cases had the diagnosis been made with

# Fatal Anaphylactic Reaction to Lidocaine

LESLIE M MORRISSET Lieutenant MC USNR

**A**NAPHYLACTIC reactions, although not new are a constant threat to any patient receiving a medicinal agent. Thousands of new drugs are being introduced each of which has the potential capability of sensitization and subsequent anaphylaxis. A reaction of this nature produces a medical emergency that is hardly equaled. In many cases the survival of the patient hinges on immediate recognition and vigorous treatment. There is little reason to conclude that the number of anaphylactic reactions will decrease. Therefore the physician and dentist must be prepared to treat these reactions and must know their early signs and symptoms.

The employment of lidocaine hydrochloride as a local anesthetic has been associated with few upward reactions. Most of those that have occurred were not fatal and no prior report can be found of any death or serious reaction attributed to lidocaine anaphylaxis.

## CASE REPORT

A 20 year-old man was given approximately 0.8 ml of 2 per cent Xylocaine (brand of lidocaine) with epinephrine 1:50,000 for preparation for an operative dental procedure. About 45 seconds after the injection he was asked because of his paleness if he felt faint but before he could answer he became unconscious. His breathing became irregular and he went into convulsions which were transient. At this point artificial respiration was started. The patient was deeply cyanotic and except for an occasional gasp appeared to be dead. A medical officer who happened to be in the building gave caffeine with sodium benzoate to the patient but no change occurred and he was pronounced dead.

On two other occasions during the preceding two weeks the patient had been given injections of Xylocaine with epinephrine from the same lot that was used on the day of his death. The previous injections did not produce toxic symptoms.

No topical anesthetic solution was used on any of the three occasions. Tincture of Merthiolate (brand of thimerosal) was used as an

From U S Naval Station San Diego Calif Dr Morris is now at 1418 Ticonderoga Dr  
El Cajo Calif

antiseptic solution but no premedication was employed. This patient had previously stated on a printed questionnaire that he had had a reaction to sulfa drugs but had not indicated an allergy to any other drugs.

Autopsy Examination at autopsy revealed that the patient had been a normally developed well nourished young adult weighing an estimated 150 pounds. There was mild cyanosis of the nail beds and mucous membranes.

The heart weighed 275 grams. In the immediate subepicardial layer a few petechial hemorrhages were seen most frequently over the deepodent surfaces. Except for petechiae noted at infrequent intervals through sections the myocardium was normal. The cardiac chambers, valves and coronary arteries appeared normal. Each lung weighed 525 grams and had a rather boggy consistency. Several petechiae were noted on the pleural surfaces. The tracheobronchial tree was normal. The pulmonary vessels were clear. The spleen weighed 275 grams and the liver 1900 grams. Marked oozing of blood occurred from the rather distended hepatic venous channels. The gastro-intestinal tract and adrenal glands were normal in appearance. Cut sections of the kidneys revealed markedly congested cortical and medullary areas.

The cerebral convolutions were flattened due apparently to mild cerebral edema. Other than this flattening there was no indication of increased intracranial pressure. Closely spaced coronal sections throughout the cerebrum, the brain stem and the cerebellum revealed no specific abnormalities other than marked congestion of the meningeal and intracerebral vessels.

## DISCUSSION

Lidocaine is a tertiary amine with the chemical name of a diethylamino 2,6 acetoxydide hydrochloride. It may be used in infiltration, block, low caudal, topical, continuous caudal, peridural, and spinal (subarachnoid) anesthesia.<sup>1</sup> According to laboratory data<sup>2</sup> its advantages are that it (1) is the most stable anesthetic agent known and may be stored almost indefinitely or vigorously heated in the presence of strong alkali or acid without appreciably decreasing its potency, (2) has an unusually short latency period, (3) has wide clinical usefulness and is adaptable to all types of conduction anesthesia, (4) has rapid diffusion properties, (5) has a relatively low toxicity, and (6) produces profound anesthesia.

Although reported side reactions have not been fatal, the drug is capable of producing serious toxic reactions when used in excess of 500 mg. The total dose for an adult should not exceed 300 to 350 mg when using the 0.5 per cent ~~0.5 per cent~~ amount gives excellent results. A 1.5 ~~per cent~~ <sup>per cent</sup> This is



- 3 Sadove M S Lat est developments in anesthetic agents *M Times* 83 291 292  
Mar 1955
- 4 Das T C Severe methemoglobinemia following dental extraction under lidocaine  
anesthesia *Anesthesiology* 17 204 Jan 1956.
- 5 Sung C Y and Truitt A P Physiological disposition of lidocaine and its com-  
parison in some respect with procaine *J Pharmacol & Exper Therap* 112 432 443  
Dec 1954
- 6 Powell W E and Nowell W K Clinical evaluation of xylocaine as regional  
anesthetic agent *Anesth & Analg* 32 350-355 Sept-Oct 1953
- 7 Merritt L M Penicillin as prophylaxis case report *Texas J Med* 51 77 78  
Feb 1955

---

### LEAD POISONING IN CHILDREN

The diagnosis of lead poisoning should be considered in all cases in which children who have a pica for paint complain of constipation abdominal pain and vomiting. It should be given first consideration in cases in which children have an isolated convulsion that is not associated with fever or other physical signs. In such instances a simple test for porphyrinuria will indicate the possibility of lead poisoning. If porphyrin is present in the urine the blood should be searched for basophilic stippling and a roentgenogram of the long bones should be made in order to determine whether or not a lead line is present. An abnormal quantity of lead in the blood or urine will confirm the diagnosis.

—HIEWORTH N. SANFORD M D  
in *Postgraduate Medicine*  
p 167, Feb 1955

# Delayed Obstruction After First Stage Repair of Omphalocele

JAMES B ANDERSON, *Major USAF (MC)*  
RICHARD P GOTCHEL, *Captain, USAF (MC)*

**O**MPHALOCELE is a rare lesion arising from an arrested reduction of the physiologic herniation of abdominal viscera which occurs and subsides during the sixth to the ninth week of gestation.<sup>1</sup> When the sac contains intestines alone, the incidence is one in 5,000 births, but when the sac also contains herniated liver, the incidence decreases to one in 10,000 births.<sup>2</sup> Between 1 October 1952 and 30 September 1955, there were three infants with omphalocele in 3,391 births at this hospital. This is considerably greater than the expected incidence.

## PURPOSE

This article reports the unusual complication of obstruction occurring three months after a first-stage repair, and contrasts the mortality of the two surgical approaches in management of large omphaloceles.

In a recent study of acute small bowel obstruction, omphalocele accounted for only 0.5 per cent of the cases in all age groups and for only 5 per cent of obstructions due to anomalies.<sup>3</sup> Although obstruction at the umbilical defect in association with omphalocele at birth has been reported,<sup>4</sup> late obstruction due to a narrowing defect following a first stage repair is not common.<sup>3, 4</sup> While it seems that such obstructions would be frequent, undoubtedly some of them are incomplete or subside unrecognized, consequently, attention is directed to the problem presented in case 1.

Despite one notable exception,<sup>5</sup> principles of management have not been sufficiently disseminated during the past five years. The need for wider and more current dissemination is illustrated by (a) the presentation at a recent surgical conference of a case of primary repair in an infant whose large herniation was forcibly reduced with fatal outcome, and (b) the management of an infant, born in October 1952 at this hospital, by difficult reduction

- 3 Sad e M S Latest d v lopme ts in an thetic ag nts M Times 83 291 292  
Mar 1955
- 4 Deas T C S ver m themoglobin m following dental xtr ctio under lidoc  
anesth sia *Anesthesiology* 17 204 Jan 1956.
- 5 Sung C Y and Truant A P Physiological dispo tion of lidoc ne and it com-  
part on in s me respect with procaine *J Pharmacol & Exper Therap* 112 432 443  
Dec 1954
- 6 Powell W E and Nowill W K. Clinical evaluati of xyloc one as a st 1  
an sthetic ag nt *Anesth & Analg* 32 350-355 Sept-Oct 1953
- 7 Morriss L M Penicillin an phyl xis case report *Texas J Med* 51 77 78  
Feb 1955

### LEAD POISONING IN CHILDREN

The diagnosis of lead poisoning should be considered in all cases in which children who have a pica for paint com-  
plain of constipation abdominal pain and vomiting It should  
be given first consideration in cases in which children have  
an isolated convulsion that is not associated with fever or  
other physical signs In such instances a simple test for  
porphyrinuria will indicate the possibility of lead poisoning  
If porphyria is present in the urine the blood should be  
searched for basophilic stippling and a roentgenogram of  
the long bones should be made in order to determine whether  
or not a lead line is present An abnormal quantity of lead  
in the blood or urine will confirm the diagnosis

—HEYWORTH N SANFORD M D  
in *Postgraduate Medicine*  
p 167 Feb 1955

# Delayed Obstruction After First-Stage Repair of Omphalocele

JAMES B. ANDERSON, M.D., USAF (MC)  
RICHARD P. GOTCHIEL, Captain, USAF (MC)

**O**MPHALOCELE is a rare lesion arising from an abnormal reduction of the physiologic herniation of abdominal viscera which occurs and subsides during the sixth to the ninth week of gestation.<sup>1</sup> When the sac contains no intestines, the incidence is one in 5,000 births, but when the sac also contains herniated liver, the incidence decreases to one in 10,000 births.<sup>2</sup> Between 1 October 1952 and 30 September 1955, there were three infants with omphalocele in 3,391 births at this hospital. This is considerably greater than the expected incidence.

## PURPOSE

This article reports the unusual complication of obstruction occurring three months after a first stage repair, and contrasts the mortality of the two surgical approaches in management of large omphaloceles.

In a recent study of acute small bowel obstruction, omphalocele accounted for only 0.5 per cent of the cases in all age groups and for only 5 per cent of obstructions due to anomalies.<sup>3</sup> Although obstruction at the umbilical defect in association with omphalocele at birth has been reported,<sup>4</sup> late obstruction due to a narrowing defect following a first stage repair is not common.<sup>5</sup> While it seems that such obstructions would be frequent, undoubtedly some of them are incomplete or subside unrecognized, consequently, attention is directed to the problem presented in case 1.

Despite one notable exception,<sup>6</sup> principles of management have not been sufficiently disseminated during the past five years. The need for wider and more current dissemination is illustrated by (a) the presentation at a recent surgical conference of a case of primary repair in an infant whose large herniation was forcibly reduced with fatal outcome, and (b) the management of an infant, born in October 1952 at this hospital, by difficult reduction

From U. S. Air Force Hospital, Bolling Air Force Base, Washington 25 D. C.

3. Sadove M. S. Latest developments in anesthetic agents. *M. Times* 83: 291-292 Mar 1955.
4. Deas T. C. Severe methemoglobinemia following dental extraction under lidocaine anesthesia. *Anesthesiology* 17: 204 Jan. 1956.
5. Sung C. Y. and Truant A. P. Physiological disposition of lidocaine and its comparison in some respects with procaine. *J. Pharmacol. & Exper. Therap.* 112: 432-443 Dec 1954.
6. Powell W. E. and Nowell T. L. Clinical evaluation of xylocaine as regional anesthetic agent. *Anesth. & Analg.* 32: 350-355 Sept-Oct 1953.
7. Morris L. M. Penicillin anaphylaxis: case report. *Texas J. Med.* 51: 77-78 Feb 1955.

### LEAD POISONING IN CHILDREN

The diagnosis of lead poisoning should be considered in all cases in which children who have a pica for paint complain of constipation, abdominal pain, and vomiting. It should be given first consideration in cases in which children have an isolated convulsion that is not associated with fever or other physical signs. In such instances a simple test for porphyrinuria will indicate the possibility of lead poisoning. If porphyrin is present in the urine, the blood should be searched for basophilic stippling, and a roentgenogram of the long bones should be made in order to determine whether or not a lead line is present. An abnormal quantity of lead in the blood or urine will confirm the diagnosis.

—HEYWORTH N. SANFORD, M. D.  
in *Postgraduate Medicine*  
p. 167 Feb 1955

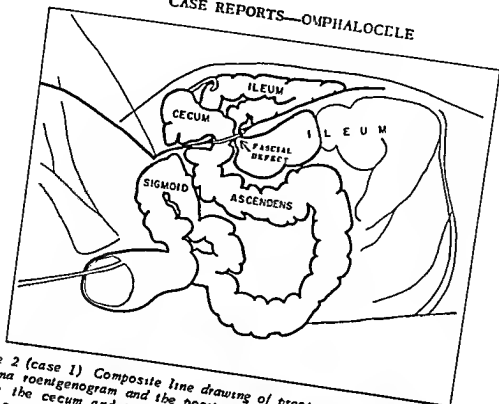


Figure 2 (case 1) Composite line drawing of preoperative findings on barium enema roentgenogram and the position of the bowel as found at operation. Note the cecum and terminal ileum herniated through the fascial defect that cannot be seen clearly on the barium enema roentgenogram in figure 1.



Figure 3 (case 1) Postoperative appearance at 18 months of age over one year after emergency second stage repair.

of a large omphalocele and primary abdominal repair which resulted promptly in respirator failure and death

### CASE REPORTS

**Case 1** A male infant was born on 16 October 1954 with a 10-cm omphalocele. Within four hours skin flaps had been mobilized under local infiltration and closed longitudinally over the intact sac. Under compression with plastic sponge and Ace bandage the mass became progressively more reducible.

At three months of age the child was readmitted because of vomiting and intermittent protrusions on each side of the upper aspect of his abdominal scar. He had refused his last feeding but distention was equivocal. A barium enema (fig 1) showed incomplete rotation but filling of the cecum to a point subjacent to the subcutaneous protrusions, moderate distention of small bowel, and a translucency of the protrusions suggestive of fluid only. Despite nasogastric suction



*Fig 1 (case 1) Barium enema roentgenogram made during second admission, prior to second stage repair*

findings of complete obstruction progressed. Surgical exploration disclosed edematous but viable cecum and terminal ileum irreducibly prolapsed through a 3 cm fascial defect. Proximally the ileum was distended (fig 2). Incisions relaxing the fascia permitted reduction and closure in layers after excision of excess tissue. Convalescence was uneventful and the child has remained well (fig 3).

rupture It is mandatory, therefore, to follow Dott's dictum that the infant should pass "from the womb to the operating table"

Treatment of large omphaloceles by reduction and primary closure in a series of 88 cases at the Boston Children's Hospital entailed a formidable mortality, namely, 25 per cent in infants with sacs measuring less than 7 cm, 70 per cent in newborns with sacs between 7 and 9 cm, and 85 per cent in those with sacs larger than 9 centimeters<sup>3</sup>

Staged management was originated and first reported by Gross and Blodgett<sup>4</sup> in 1940 Gross's modification, whereby the sac was not excised prior to covering with skin flaps, was reported in 1948 In contrast to the formidable mortality in primary closure, life expectancy in infants with large but otherwise viable omphaloceles treated by staged management at the Boston Children's Hospital was vastly improved Although obstruction arising from malrotation or from less frequent causes has occasionally necessitated subsequent operation, such theoretical complications as infection, cyst formation, sloughing of skin flaps, epidermal inclusions, and obstruction due to adhesions have failed to materialize<sup>5</sup> Malrotation is present in about one third and may give rise to obstruction requiring surgical relief at the time of the first-stage repair or subsequently<sup>3, 10</sup> Nearly two thirds of these infants have other anomalies which may be either inconsequential irregularities or serious cardiorespiratory, urogenital, or gastrointestinal defects

### SUMMARY AND CONCLUSIONS

Three newborn infants with large omphaloceles were treated at this hospital during the past three years, two by staged management with gratifying results and the other by difficult closure with a dismaying fatal outcome The unusual complication of delayed obstruction due to a narrowing fascial defect that required emergency second stage repair when the patient was three months old is reported

Large omphaloceles must be approached promptly by staged management To attempt primary closure by forcibly reducing herniated viscera into an inadequate compartment is to invite disaster, prompt relaxing incisions may avert this outcome when ever primary repair results in respiratory failure<sup>10</sup>

Covering the sac by skin flaps is a relatively simple procedure when done under local anesthesia, correction of other serious anomalies may require general anesthesia

Vomiting at any time postoperatively should be investigated forthwith to confirm or rule out intestinal obstruction



Enlargement of a small fascial defect at the time of the first stage procedure may preclude subsequent obstruction caused by progressive closure of the umbilical ring

#### REFERENCES

- 1 Patten B M. Body cavities and mesenteries. In Patten B M. *Human Embryology*. The Blakiston Co Philadelphia Pa. 1946 p 361
- 2 Anderson N A. Diseases of newborn infant. In Nelson W E, (editor) *Mitchell Nelson Textbook of Pediatrics* 4th edition. W B Saunders Co Philadelphia, Pa. 1945 p 253
- 3 Bollinger J A. and Fowler E F. Results of treatment of acute small bowel obstruction: clinical study of 205 consecutive cases. *A. M. A. Arch. Surg.* 66: 888-904, June 1953.
- 4 Byran, T B L. Case of exomphalos complicated by acute intestinal obstruction. *Brit. M. J.* 2: 818-819 Dec. 23 1944
- 5 Gross R. E. Omphalocele. In Gross R. E. *The Surgery of Infancy and Childhood*. W B Saunders Co Philadelphia Pa. 1953, pp. 406-422.
- 6 Jason A. H. Congenital eventration at umbilicus. *Surgery* 16: 950 Dec 1944.
- 7 Dott N M. Clinical record of a case of exomphalos illustrating embryology and its surgical treatment. *Tr. Edinburgh Obst. Soc.* pp 105-108 1931-1932. *Edinburgh M. J.* Aug 1932.
- 8 Gross R. E. and Blodgett J B. Omphalocele (umbilical herniation) in newly born. *Surg. Gynec. & Obst.* 71: 520-527 Oct. 1940
- 9 Gross R. E. New method for surgical treatment of large omphaloceles. *Surgery* 24: 277-292 Aug 1948.
- 10 Kahle H. R. Omphalocele, analysis of 21 cases from Charity Hospital of Louisiana at New Orleans. *Am. Surgeon* 17: 947-958, Oct. 1951.

## A MESSAGE FROM THE A M A

A medical news publication recently carried an item concerning a Department of Justice report of a record sum settlement in a malpractice case involving the United States. It was stated that the suit, in which an ex-servicewoman won a \$210,000 court judgment for disability resulting from continuous caudal anesthesia administered in a military hospital, was settled for \$175,000.

Medical professional liability is one of the most frequently discussed and most important subjects of interest to military and civilian physicians today. In December 1954, the Board of Trustees of the American Medical Association requested the A M A Law Department to plan and initiate a comprehensive study of medical professional liability. For the past two years, the Law Department has been conducting an exhaustive survey of this subject. It has collected facts, figures, and opinions on medical professional liability. This material has been studied and analyzed, and is now in the process of being made available to the medical profession.

In planning this study, it was decided that the following projects should be undertaken: (1) an analysis of state insurance laws and regulations, (2) a review of state statutes of limitation, (3) an analysis of reported cases, (4) an analysis of professional liability claims involving physicians in Government service, (5) a survey and analysis of pertinent state legislation, (6) a survey of state medical societies, (7) a survey of national medical societies, and (8) a sample survey of 5 per cent of the physician members of the A M A.

In addition to these projects, various topics were selected for articles to be included in a special series on the subject of professional liability. The topics to be covered are: (1) The History of Professional Liability Claims in the United States, (2) "Put It in Writing, Doctor", (3) Medical Legal Hazards: Anesthesia, (4) Physicians Expressing Opinions as to Form Treatment, (5) The Res Ipsa Loquitur Case, (6) The Rule of Respondat Superior, (7) Hazardous Therapy, (8) New Concepts in Professional Liability Suits, (9) Professional Liability Claims.

---

From the Council on National Defense of the American Medical Association. The views and opinions expressed are not necessarily those of the Department of Defense.  
—Editor

Pravention, (10) Profassional Liability Insurance Coverage (11) Profassional Liability Claims in England, and (12) The Law of Professional Liability

Professional liability claims involving military or federally employed physicians are usually instituted pursuant to the provisions of the Federal Tort Claims Act. Military personnel are precluded from recovery from the United States for malpractice under this law. However they may proceed against the physician and a judgment if rendered, would be against him personally. Military dependents usually proceed against the United States under the Federal Tort Claims Act in military malpractice cases.

Generally speaking, the legal principles governing medical professional liability of civilian practitioners are equally applicable to military and federally employed physicians with only minor exceptions. The military physician is personally responsible for negligence that results in injury to his patient in the same manner and to the same extent as if he were in private practice with one exception. If the injured person elects to proceed against the United States under the Federal Tort Claims Act and recovers a judgment against the United States the physician is relieved from pecuniary liability.

It is to be noted that under this Act there is no monetary limitation in the amount obtainable in a malpractice suit against the United States. However since administrative settlement of these claims is limited by the terms of the Act to amounts not in excess of \$1 000, it is readily apparent that few administrative settlements are made for personal injury alleged to have resulted from malpractice.

Since Government physicians whether they be in the military service or otherwise, are salaried personnel, no question generally arises as to the legal principles of the rule of *respondet superior* (let the master answer). Accordingly the Government is responsible for the negligent acts of its employees that are committed during the course of their employment. As a result and because of the guarantee of solvency and the relative ease of collectibility of a judgment against the Government malpractice suits are usually brought either against the Government alone or against the Government as a codefendant with the allegedly negligent physician employee.

Instances of suits against Government employees alone under the Federal Tort Claims Act have been and it would seem should continue to be relatively rare. As to further protection the physician employee may request and the Department of Justice will authorize the U S Attorney of Jurisdiction to assume the

defense of the employee, where to do so would best serve the interest of the United States

Beginning with the 2 February 1957 issue, selected articles on medical professional liability have been appearing in the *Journal of the American Medical Association*. Those articles will be reprinted in booklet form and will be available on request from the American Medical Association

---

\* As to the Abuses I meet with      you must know I number among my Honours. One cannot behave so as to obtain the Esteem of the Wise and Good without drawing on one's self at the same time the Envy and Malice of the Foolish and Wicked and the latter is a Testimony of the former. The best Men have always had their Share of this Treatment, and the more of it is in proportion to their different and greater degrees of Merit. A Man has therefore some Reason to be ashamed of himself when he meets with none of it. And the World is not to be condemn'd in the Lump because some bad People live in it.

—BENJAMIN FRANKLIN  
London  
Mar 2 1767

## DISTINGUISHED VISITORS TOUR ARMY HOSPITAL IN GERMANY

During a 20-day field demonstration the U S Army 46th Surgical Hospital at Landstuhl Germany received visitors from all over Europe. Among them were NATO team member General Raffaele Squillacioti who is the Italian Surgeon General, USAREUR Medical Surgical Conference, and Army nurses attending a workshop here.



*General Squillacioti examining the new polaroid roentgenogram processing unit.*

General Squillacioti's tour of the mobile Seventh Army unit was representative of the reception accorded all the inspectors. Accompanied by his interpreter Major Antonio Mazzarella, the Surgeon General was briefed by Captain Bryan T. Lowe, hospital commander. Captain Lowe underscored the unit's mobility by stating, "Within two hours the 46th can be set up and ready to admit patients." He explained that its mission is to receive and care for nontransportable casualties.

At the request of General Squillacioti a résumé of the hospital's record followed which emphasized its efficient performance in Korea as the 351st Surgical Hospital

The Italian visitor began his inspection in the preoperative ward, where he observed admission procedures. He then proceeded to surgery, and described a display of surgical instruments as "among the finest I've seen." He contrasted the adjustable operating table with the fixed type used by the Italian Army.

In the X-ray Division a polaroid filming and processing unit, one of the first employed by a field outfit, was demonstrated. This new technic requires only 1 minute and produces a positive rather than a negative roentgenogram. The routine method used for detailed work, requires 10 minutes and yields a negative.

Viewing the nonmedical sections General Squillacioti registered approval and amusement at the "Man from Mars" rubber decontamination uniforms worn by chemical, bacteriologic, and radiologic teams.

---

#### HOW TO HOLD YOUR AUDIENCE

In a scientific meeting, like it or not, people will not listen to you unless you can catch and hold their interest. For this reason the presentation of a scientific paper is in some respects a show, and details of showmanship must be exploited. The nourishing of a stream of interest in an audience requires the use of "props"—usually lantern slides, occasionally models or exhibits—in which must be combined the unexpected, the pleasing, and the familiar with a slight variation. In this material, color, composition, and lighting (or ease of viewing) are of first importance.

—ROBERT P. BARDEN, M.D.  
in *Radiology*  
p. 875, June 1954

## ADMIRAL HOGAN RECEIVES GEORGETOWN UNIVERSITY AWARD

Rear Admiral Bartholomew W. Hogan, Surgeon General of the U. S. Navy, received the Georgetown University Vicennial Medal in recognition of many years of faithful and distinguished service at ceremonies held during the Founder's Day Convocation on 25 March 1957.



*Front and back of Georgetown University Vicennial Medal awarded to Admiral Hogan.*

The Georgetown University Vicennial Medal was struck as a symbol of gratitude and respect to the men who have devoted twenty or more years to Georgetown in her advancement in education. Admiral Hogan has been Associate Professor of Psychiatry at the University Medical School since 1936.

## OFFICERS CERTIFIED BY SPECIALTY BOARDS

### Supplementary Listing

According to information from the Offices of the Surgeons General of the military medical services, the following regular Medical, Dental, and Veterinary Corps officers have been certified by the boards indicated since the listings published in previous issues of this *Journal*

#### American Board of Orthopaedic Surgery

Harry B. Elsberg, Capt. USN

#### American Board of Internal Medicine

Nicholas G. Battiglietti, Maj. USA

Ray F. Fitch, Capt. USAF

Stephen J. Berke, Lt. Col. USA

Donald L. Howie, Lt. Col. USA

#### American Board of Pathology

Joseph F. Metzger, Maj. USA

John P. Ray, Jr., Capt. USA

#### American Board of Ophthalmology

Kenneth Somers, Col. USA

#### American Board of Surgery

Strother B. Marshall, Capt. USAF

William C. Turville, Comdr. USN

James E. McClenathan, Lt. Comdr. USN

Edward H. Vogel, Jr., Lt. Col. USA

William C. Rountree, Maj. USAF

#### American Board of Preventive Medicine

##### Public Health

Herschel E. Griffin, Lt. Col. USA

#### Board of Thoracic Surgery

(A Subsidiary Board of the American Board of Surgery)

Frank E. Hagman, Col. USA

Thomas H. Hewlett, Lt. Col. USA

#### American Board of Oral Pathology

Henry H. Scofield, Jr., Lt. Comdr. USN

#### American Board of Oral Surgery

Gerald H. Bonnette, Capt. USN

Edward A. Gargiulo, Comdr. USN

Donald E. Cooksey, Capt. USN

David Hazard, Lt. Col. USA

#### American Board of Pedodontics

Gordon H. Rovelstad, Comdr. USN



**American Board of Periodontology**

Claud M Frleigh C pt USN

Jerome F Peter Comdr USN

**American Board of Prosthodontics**

Milton H Brown Capt USN

D v s H detso Capt USN

Benjamin W Dunn Col USAF

F eder k R Krug Lt Col USA

J bn R Frost Lt Col USA

Allen L McInturff C pt USN

Charl s M Heartw ll C pt USN

**American College of Veterinary Pathologists**

James E Cook C pt USAF

Donald H Yost Capt USA

**American Board of Veterinary Public Health**

Le t r j Gorman Lt Col USAF

Mulford C Lockwood Lt Col USA

---

**Stop!**

The American Korean Foundation and the United States Army Medical Service have announced the discontinuation of their joint project of shipping to Korea medical books contributed by individual physicians medical schools hospitals and state and local medical societies Books should not be sent to the Sharpe General Depot in California as in the past for facilities no longer exist for packing and transshipping to Korea

The response of physicians and medical groups throughout the country to the appeal for books for Korean medical schools has been so generous that further contributions are not needed As a result of this program over 77 tons of medical texts references and periodicals valued at \$76 000 have been shipped to Korea for distribution to Korean medical schools

## A M A Military Medicine Section Meeting

A stimulating professional program will be presented at the annual meeting of the Section on Military Medicine of the American Medical Association's Scientific Assembly. The meeting will be held in the Coliseum located at Columbus Circle in New York City during the afternoons of 4, 5, and 6 June.

Speakers and discussants on the program include many prominent military and civilian physicians and scientists who will present a wide variety of timely and interesting topics.

Among the exhibits of the Military Medicine Section to be shown are

- Acute Respiratory Illness of Adenovirus (RI APC) Etiology in Military Populations
- Disease Free Laboratory Animals
- Newer Approaches to the Study of Liver Diseases
- Pediatric Diagnostic Clinic
- Psychiatry in the U. S. Navy's Operation Deep Freeze
- Clinical Diagnostic Studies Utilizing Radioactive Isotopes
- Present Day Method of Moving Poliomyelitis Patients
- Eye Protection Against Minuteman High Speed Missiles
- U. S. Air Force Occupational Health Program

The chairman of this section is Colonel Russel V. Lee, USAFR (MC) Inactive, and the secretary is Captain Cecil L. Andrews, MC, USN. The chairman's opening address will be on "The Military Surgeon—a Specialist."

Point credits for retirement may be earned by all eligible Reserve Medical Corps officers of the Army, Navy, and Air Force who register their attendance.

## Kimble Methodology Research Award for 1957

Nominations for the Sixth Kimble Methodology Research Award will be accepted until 1 June 1957 by the Conference of State and Provincial Public Health Laboratory Directors. This award established by the Kimble Glass Company, Toledo, Ohio, consists of \$1,000 and a silver plaque and will be presented at the annual meeting of the Conference in Cleveland, Ohio, in November 1957.

Candidates must be from the United States, its territories, or Canada.

To be considered for nomination, their work should be either (a) a fundamental contribution that serves as a baseline for development of diagnostic methods which fall within the province of the public health laboratory, or (b) the adaptation of a fundamental contribution to make it of use in a diagnostic laboratory.

Nominations may be made by authors, their associates, or others. A nomination should be accompanied by a statement justifying the recommendation, six summaries of the work, and six reprints. If reprints are not available, six summaries with bibliography will be accepted. Nominations may consist of a group of workers or one author. If the former, the cash award will be divided among the workers, but the plaque accompanying the cash award will become the property of the laboratory where the work was done.

Nominations should be sent to Howard L. Bodily, Ph.D., Chairman, Nominating Committee, Kimble Award, State Department of Public Health, Division of Laboratories, 2151 Berkeley Way, Berkeley 4, Calif.

## DEATHS

- BEXFIELD** Henry Nielsen Major, MSC USAR of San Luis Obispo Calif stationed at Detachment 2 9771 Technical Unit Dugway Utah attended the University of Illinois College of Pharmacy 1921 to 1923 commissioned a Second Lieutenant in the Army of the United States on 24 March 1943 died 20 December 1956 age 57 at Fitzsimons Army Hospital Denver Colo of lymphoblastic sarcoma of the lung
- BOUDREAU** Frederick Joseph, First Lieutenant DC USAR of Philadelphia Pa. stationed at 665th Medical Detachment Korea graduated in 1956 from Temple University School of Dentistry Philadelphia, Pa commissioned a First Lieutenant in the U S Army Reserve and ordered to active duty 14 June 1956 died 22 February 1957, age 25 in Korea, due to an aircraft accident
- CARPENTER** Sharon Opal First Lieutenant ANC USAR, of Washington D C. stationed at 33d Station Hospital USAREUR attended St Mary's College of Nursing, Calif and University of San Francisco Calif entered the military service 30 June 1943 and commissioned a Second Lieutenant in the U S Army Reserve 22 April 1953 died 22 February 1957 age 32 at Letterman Army Hospital San Francisco Calif of astrocytoma left cerebral hemisphere
- EDDY** Arnold Austin Captain MSC, USAR of Detroit Mich stationed at Fort Leonard Wood Mo entered military service 22 August 1938; commissioned a Second Lieutenant in the Army of the United States 9 June 1943 died 25 February 1957 age 38 at U S Army Hospital Fort Leonard Wood Mo of cirrhosis of the liver
- SHINABERGER** George Benjamin Second Lieutenant MSC USAR of Atlanta Ga stationed at Headquarters 3d USA Student Detachment Emory University Atlanta Ga attended Emory University 1953 to 1956, commissioned a Second Lieutenant in the U S Army Reserve and ordered to duty 3 September 1956, died 26 January 1957 age 24 at Atlanta Ga of multiple fractures and lacerations the result of an automobile accident
- SUMNER**, John Worthington Jr Lieutenant Colonel MC USA of Portland Conn stationed at Second General Hospital Germany graduated in 1941 from Columbia University College of Physicians and Surgeons New York N Y commissioned a First Lieutenant in the U S Medical Reserve Corps 3 June 1941 and Captain in the Regular Army 12 July 1946 died 24 February 1957 age 42 at the Second General Hospital Germany of myocardial infarction
- THOMAS** Howell Alexander Lieutenant Colonel DC USAR of Aransas Pass Tex stationed at Headquarters and Headquarters Detachment U S Army Hospital Fort Sill Okla graduated from Baylor University College of Dentistry in 1927 commissioned a First Lieutenant in the U S Army Reserve 13 July 1929 and ordered to active duty 9 July 1942 released from active duty 5 March 1945 and returned to active duty 12 February 1951 died 5 February 1957 age 54 at Brooke Army Hospital Fort Sam Houston Tex of a fulminating infection

## ROYAL AIR FORCE OFFICER COMMENDED FOR ACHIEVEMENTS IN AVIATION MEDICINE

In a ceremony at the Pentagon on 27 March 1957 Wing Commander E. Bruce Harvey Royal Air Force was presented with a letter of commendation from the Department of Defense by Dr Frank B. Berry, Assistant Secretary of Defense (Health and Medical).



*Dr. Frank B. Berry presenting letter of commendation to Wing Commander E. Bruce Harvey in the presence of the Surgeons General of the United States Army Major General Silas B. Hays, the United States Navy Rear Admiral Bartholomew W. Hogan, and the United States Air Force Major General Dan C. Ogle.*

The commendation signed by the Honorable Charles E. Wilson, Secretary of Defense, is reproduced on the opposite page.

May 1957)

ROYAL AIR FORCE OFFICER COMMENDED

763

THE SECRETARY OF DEFENSE

WASHINGTON

15 March 1957

Subject Commendation

To Wing Commander E Bruce Harvey Royal Air Force

With the full endorsement of the Surgeons General of the United States Army Navy and Air Force the Department of Defense commends you for your significant achievements in the field of aviation medicine during your tour of duty in Washington D C as Royal Air Force Liaison Officer to the United States and Canada This commendation refers particularly to your initiative and foresight in recognition of one of the major problems in aviation medicine and for your diligence and industry which led to the establishment of the Joint Committee on Aviation Pathology

This problem is the unexplained major aircraft accident with its resulting fatalities Excellent research work has been accomplished in both of our nations bearing on the causative factors involved In your country the brilliant work of Armstrong, Fryer, Stewart and Whittingham has contributed notably to an understanding of the Comet accidents in 1954 Stimulated by these investigations you displayed vision and resourcefulness in arousing the military medical services of the Department of Defense, and of the Royal Air Force the Royal Navy and the Royal Canadian Air Force to the desirability of uniting their efforts in a combined and comprehensive study of the human component in aircraft accidents through a Joint Committee on Aviation Pathology This Committee promises to be a cogent force in the development of tri partite action for the prompt collection and dissemination of pertinent clinical physiologic pathologic and experimental information to eliminate duplication of effort in our countries and hasten the progress of aeromedical research

By your superior devotion to duty keen professional judgment and diplomatic skill you have contributed immeasurably to the progress of aviation medicine and flight safety At the same time you have enhanced the bonds of friendship among the United Kingdom Canada, and the United States and coordinated a mutually beneficial approach to the solution of the causative factors of major aircraft accidents

A copy of this letter has been forwarded to your superior officer with the request that it be made a part of your official record

*C E Wilson*

## CORRESPONDENCE

*To the Editor*—I read the article on the "Treatment of Paraphimosis" in the March 1957 *Journal* and was quite interested. I recently served in Korea and was called upon to treat several patients with paraphimosis. I never encountered as severe a case as described in the article but did have two with acute paraphimosis. Although they were devoid of infection or necrosis, manual reduction was not possible and both patients were considered for surgical intervention by a dorsal slit. Before resorting to surgery, which would have been impractical at night at dispensary level, a half cc of hyaluronidase was injected into the edematous foreskin and massaged gently. Within five minutes the foreskin was easily reduced manually. This is not a large series but in the uncomplicated case of paraphimosis it is certainly worth a try, especially at the dispensary level. I hope this might be of interest to other dispensary medical officers.

DAVID K. GINSBERG, Captain MC USA  
U. S. Army Dispensary  
Indiantown Gap Military Reservation, Pa.

---

### **Second European Congress of Aviation Medicine to be Held in September**

The Second European Congress of Aviation Medicine will be held at Saltsjöbaden in the vicinity of Stockholm, Sweden, from 16 to 19 September 1957.

The main topics scheduled for discussion during the meeting are:

Gravitational Stress

Standardization of Tolerance Tests in Human Centrifuges

Trends in Engineering Psychology and Psychophysiology in Aviation Medicine

Decompression Sickness and Explosive Decompression

The president of the Congress is Prof. E. Hohwü Christensen, while the Chairman of the Executive Committee is Dr. Arne Frykholm. For full information in regard to the program and arrangements, address Dr. Olle Hook, Secretary General, Flygväpnet, Stockholm 80, Sweden.

## Reviews of Recent Books

THE PHYSICIAN WRITER'S BOOK *Tricks of the Trade of Medical Writing*, by Richard M. Hewitt A. M. M. D. 415 pages; illustrated W. B. Saunders Co., Philadelphia, Pa., 1957

Doctor Hewitt, onetime assistant editor of the *Journal of the American Medical Association* and in recent years senior consultant, Publications Section, the Mayo Clinic, has written a very practical guide to medical writing graphically and lucidly indicating the way to plan develop construct and finally finish a contribution to the medical literature. For many years now the profession has been in need of such a guide to medical writing.

The author with his mature outlook, thoroughly understands the problems confronting the busy physician who wishes to publish his observations. He indicates the many pitfalls to avoid and adequately demonstrates by example how this can be accomplished.

The author shows how to avoid "medicalese," "verbal arithmetical muddles" and the use of unauthorized abbreviations emphasizing the value of clarity, brevity, and good taste in the medical manuscript. He brings out by example the value of illustrations, the proper use of tables and even how to properly construct a sentence and build a paragraph. There is a valuable and interesting appendix which serves to elaborate on the textual material. The cross referenced index makes it easier for the reader to locate his precise point of interest.

This volume is of inestimable value to all physician writers, irrespective of their experience level.

—PAUL V. DAVIS Col USAF (MC)

FUNDAMENTALS OF CLINICAL FLUOROSCOPY With Essentials of Roentgen Interpretation by Charles B. Storck M. D. 2nd Edition 305 pages illustrated Grune & Stratton Inc. New York N. Y. 1957 Price \$8.75

The second edition of this popular text has been expanded to include new sections on neoplastic disease of the pancreas of the stomach, congenital heart disease, small bowel examination, intestinal obstruction and fluoroscopy of the gallbladder. Its aim is to give the student an intelligent meaningful approach to the study of application of diagnostic fluoroscopy. It is easy to read. The text is chosen photographs and diagrams are accompanied by questions consisting of specific questions and answers to test the student's features of diagnosis. Although the title suggests it is not a



clinical fluoroscopy as compared to radiographic examination the author stresses the importance of knowledge and skill in radiographic interpretation as a prerequisite to clinical fluoroscopy This requirement is effectively met by a well integrated presentation of the basic anatomy of both normal and abnormal radiographic features.

This text is highly recommended and merits the attention of those in the field of diagnostic roentgenology and is almost indispensable to beginners in the field of clinical fluoroscopy

—DELL F DULLUM Col MC USA

**OCCUPATIONAL THERAPY Principles and Practice** by William Rush Dunton Jr M D and Sidney Licht M D 2d edition 373 pages illustrated Charles C Thomas Publisher Springfield Ill 1957 Price \$8

For the physician who seeks a comprehensive orientation on occupational therapy this book is valuable This completely revised edition contains 16 chapters including new chapters on occupational therapy in pediatrics geriatrics remedial games and music in hospitals Each chapter was contributed by a different expert except that Dr Dunton and Dr Licht in addition to serving as editors served as author or coauthor on several chapters Particularly interesting are the chapters on cerebral palsy by Dr Winthrop M Phelps and on heart disease by Dr Paul D White

Orthopedic surgeons and physicians engaged in medical rehabilitation will find highly useful the chapters on kinetic occupational therapy and on the upper extremity amputee In the latter the dynamic approach of Rusk is reflected

This book is sturdily bound and attractively printed It is a must for the library of all who would join in the theme that the physician's duty is not fulfilled until the patient is restored to his fullest mental and physical capacity Occupational therapy as described in this volume can make a major contribution in attaining this important goal

—BENJAMIN A STRICKLAND JR Col USAF (MC)

**BORDERLANDS OF THE NORMAL AND EARLY PATHOLOGIC IN SKELETAL ROENTGENOLOGY** by Prof Dr Alban Köhl 10th edition completely revised with reference to illustrations and to text by Dozent Dr E A Zimmer Bern/Fribourg English translation (from the 10th German edition) arranged and edited by James T Case M D D M R E (Cambridge) 723 pages 1300 illustrations Gune & Stratton Inc N w York N Y 1956 Price \$24 50

This latest edition of a standard and excellent reference work deals as the title indicates with the borderlands of the normal in skeletal roentgenology The text is concerned primarily with what might be called the minutiae of skeletal anatomy The common as well as the rare deviations from normal that can be so troublesome to the radiologist are discussed concisely and authoritatively

This is not a book to be picked up and read from cover to cover. The subject material is much too encyclopedic in nature to be taken in one massive dose. It is, however, a valuable and authoritative reference book that one can turn to frequently to settle a moot point. For this reason it can be vastly important in medicolegal situations.

The second edition of this work, published in 1935, has been regarded by many older radiologists as an essential source of important information. The tenth edition is greatly expanded and benefits from the experience of hundreds of observers and writers listed in the voluminous bibliography.

The roentgenograms have been reproduced in the positive and are, for the most part, of excellent quality. They were carefully trimmed before reproduction and reveal only pertinent points of interest. There are also many photographs, diagrams, and line drawings of good quality. The index is adequate and the paper and binding are excellent.

The book is recommended to all radiologists and orthopedic surgeons.  
—ELMER A. LODIELL, Col. MC USA

**ADVANCES IN PEDIATRICS** Volume IX, 1957, edited by S. Z. Levine, 336 pages, illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1957. Price \$9.

The current edition represents an improvement in this already excellent series. Among the subjects covered in this volume are post-maturity, the gamma globulins, thyroid disorders, familial dysautonomia, the coagulation disorders, and celiac disease.

Especially refreshing was the excellent summary of the effectiveness of fluoridation in the prevention of dental caries. The excellent summary of the various studies which have been carried out, presented here by Schlesinger and Ast, leaves little room for doubt as to the value of this measure. The excellent statistical approach provides the pediatrician with invaluable data for reassurance to parents and civic health groups. It is not possible in this review to mention all of the articles, but all provide new and interesting observations with excellent summations. —DANIEL STOWENS, Maj. MC USA

**THE YEAR BOOK OF GENERAL SURGERY** (1956-1957 Year Book Series), edited by Everts A. Graham, A. B. M. D., with a section on Anesthesia, edited by Stuart C. Cullen, M. D., 647 pages, illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1956. Price \$6.75.

This latest annual volume in the series of surgical year books is as before composed of abstracts of representative articles from the surgical journals published during the past year. The book is divided into sections and articles in the various fields are grouped together. Articles are indexed by author and by subject material.

The abstracts are clear, well-written, and are representative of the general trends to be found in the voluminous literature. The

editorial comments underline important or controversial points. The diagrams are well drawn and labeled.

This volume ranks with its predecessors as an excellent reference for the recent surgical literature. It should, however, be used only as a reference for a more thorough study of the original articles.

In addition by selection and grouping of the articles the editor emphasizes recent trends in surgical thought and practice.

—PHILIP D. CRONMILLER, Comdr MC, USN

**ATLAS OF TUMORS OF THE NERVOUS SYSTEM** by H. M. Zimmerman M.D. and Martin G. Netsky M.D. and Leo M. Davidoff M.D. 191 pages 277 illustrations 233 in color 4 tables Lea & Febiger Philadelphia Pa 1956 Price \$25

This long-awaited Atlas presents for the first time a color treatise on tumors of the nervous system. The inadequacy with which black and white photographs depict gross and microscopic pathology is well known. The 233 color illustrations in this volume must represent the largest color collection on pathology in print.

The authors, two neuropathologists and a neurosurgeon, are well qualified to collect and present the material. The student and teacher in the fields of neurology and neuropathology have long been familiar with the various papers of Zimmerman and Netsky and the papers and books of Davidoff on the central nervous system are well known.

As with any color printing there are a few plates that do not appear to be "true" color. However, the majority of the plates are faithful reproductions.

The clinical and pathologic features of the various tumors are succinctly reviewed. An extensive bibliography covering the major works on each tumor is presented in the appendix.

This atlas will be useful to the student and teacher in the field of clinical neurology, neurosurgery and neuropathology. It will be an excellent guide for the candidate reviewing for American Board examinations. —ROBERT L. WILLIAMS Maj USAF (MC)

**CLINICAL PATHOLOGY: Application and Interpretation** by Benjamin B. Bell M.D. Ph.D. 2d edition 488 pages illustrated W.B. Saunders Co Philadelphia Pa 1956 Price \$8.50

Clinical pathology is truly the fusion of the laboratory and the bedside. A textbook on clinical pathology as written by the internist provides the medical student and physician guidance in the interpretation of the laboratory report. This book attempts to cover the entire range of clinical pathology from infectious diseases through the diseases of the various organs. Chapters are also included on clinical laboratory studies in surgery and in obstetrics.

The author's objectives are commendable and his introductory considerations are admirable. In essence he reaffirms the place of the physician in the care of the patient and advocates the use of the laboratory wisely, judiciously, and properly.

This book will serve as a compendium identifying the large variety of procedures and giving elementary interpretation. It will demonstrate that the clinical pathologist needs to assist the internist in the selection and interpretation of laboratory tests for the clinical patient.

—ABRAHAM BENENSON Lt Col MC, USA

**MANUAL OF ANESTHESIOLOGY** For Residents and Medical Students by Herman Schwartz M D, S H Ngai M D and E M Papper M D. American Lecture Series, Publication No 298, A Monograph in The Bannerstone Division of American Lectures in Anesthesiology, edited by John Adnani M D. 170 pages illustrated. Charles C Thomas, Publisher Springfield, Ill, 1957. Price \$4.25.

This 170 page manual is written for the medical student and resident in anesthesiology. It has achieved its avowed purpose by simple and concise wording. Nurse anesthetists should also find it useful.

The chapters on the physiology of respiration and circulation are particularly outstanding because of their clarity, simplicity, and excellent illustrations. The anatomy of the upper respiratory tract is well demonstrated. The chapter on physics as related to anesthesiology is useful in reviewing for board examinations. The beginner will find enough information in this chapter to understand the primary problems in medical physics.

The chapters devoted to clinical techniques are short and informative, while one of the longer chapters is devoted to pediatric anesthesia. This manual summarizes information needed by medical students for their course in anesthesiology. The nurse anesthetist student should find it useful as a text of basic information. The physician should find it an excellent book to familiarize himself with the entire problem of administering anesthetics.

The physician reviewing for examinations might find these capsules of information a stimulus to further reading.

—ARTHUR B. TARROW Col. USAF (MC)

**THE RECURRENT LARYNGEAL NERVES IN THYROID SURGERY** by William H. Rustad, M D. 47 pages illustrated. Charles C Thomas, Publisher Springfield Ill. 1956. Price \$4.50.

This monograph is written in a clear, concise and easy to read fashion. The first portion of the book very effectively reviews the historical background and gives a brief but complete discussion of the functional anatomy of the larynx, the embryology and anatomy of the recurrent laryngeal nerves, and an excellent summary of the clinical considerations necessary in the surgery of this area. The second portion is concerned with 11 groups of excellent anatomic

illustrations accompanied by concise descriptive material portraying the marked variability of the anatomy as found on dissection of 125 cadavers

This book is certain to stimulate increasing caution even by the most seasoned thyroid surgeon. It will be most useful to the trainee and as a quick review prior to performing operations of the region

—OAKLEY K. PARK, Lt. Col. USAF (MC)

**AMINO ACID HANDBOOK.** Methods and Results of Protein Analysis by Richard J. Block Ph. D. with the co-operation of Kathryn H. Weiss. A. B. 386 pages illustrated. Charles C. Thomas Publisher, Springfield, Ill. 1956. Price \$10.50

Dr. Block's most recent monograph provides detailed procedures for the determination of amino acids present in virtually any material plus a wealth of information concerning the amino acid composition of a wide range of proteins, polypeptides, and foods. Consistent with the handbook objective of this volume, there are more than 66 pages of references to the literature on protein analyses. A similar magnitude of space is devoted to tabular presentations of the amino acid composition of animal, plant, enzyme, virus, and food proteins. Dr. Herman J. Almquist has contributed a chapter on methods pertinent to the study of protein and amino acid requirements of animals.

The section on methodology begins with a very ample consideration of the means by which the specimen is prepared for analysis, including methods for the determination of nitrogen, the removal of lipids, nucleic acids, carbohydrates, inorganic ions, and the hydrolysis of proteins. Thereafter, there is a presentation of procedures for the determination of amino acids by chemical and microbiological methods and by the use of paper and column chromatography. The chapters dealing with the employment of micro-organisms and column chromatography were written by Dr. Sidney Saperstein and Dr. William G. Gordon, respectively.

The protein chemist will welcome this volume as a most valuable compendium of tested information concerning methods and results of amino acid analyses. The latter data will also serve well the needs of the various specialists who may require a knowledge of the natural availability of particular amino acids.

—THADDEUS J. DOMANSKI, Col. USAF (MSC)

**CYTOLOGIC TECHNIQS.** For Office and Clinic by H. E. Nieburgs, M.D. 233 pages illustrated. Grune & Stratton, Inc., New York, N.Y. 1956. Price \$7.75

This small volume is packed with information and methods for cytologic examination. In the 14 years since the publication of Papanicolaou's monumental work on the diagnosis of cancer by vaginal smear, cytological examinations have found an ever increasing field of application in cancer detection and treatment. The author has

gathered and condensed from his own wide experience and from the literature the most useful and important technics of cytology. Instruments and methods of collecting specimens are described. In addition to staining technics and diagnostic criteria, other facets such as laboratory organization and the training of technicians are covered and elaborated on with excellent photographs, photomicrographs, charts and diagrams. All physicians can find this book a valuable reference on cytology.

—ROALD A. GRANT Capt MC USN

**PRE AND POST OPERATIVE CARE IN THE PEDIATRIC SURGICAL PATIENT** edited by William B. Kieseewetter M D 347 pages illustrated. The Year Book Publishers Inc. Chicago Ill. 1956 Price \$7

This compact volume on the pre and post-operative care of infants and children is an excellent manual for the pediatric surgeon. The text written in outline form, is adequate and concise. It contains some standard formulas for the treatment of dehydration, acidosis, and other electrolyte problems that are valuable to the practicing surgeon as well as to the student. There are times when the surgeon does not have a qualified pediatrician available, and the material in this book helps in a measure to supply that need. As stated in the foreword, the replacement of blood, the maintenance of electrolyte balance and skillful anesthesia have made possible the performance of extensive surgery in infancy and childhood. The preparation of the patient for operation and the principles of healing are dealt with in this work. Each chapter provides a helpful bibliography for more extensive reading on subjects mentioned in the text. This book is quite well adapted to the needs of trainees in general surgery.

—ROBERT L. RHEA, Jr Col MC USA

**ANESTHESIA FOR SURGERY OF THE HEART** by Kenneth K. Keown M D, F A C A American Lecture Series Publication No. 304, A Monograph in The Bannerstone Division of American Lectures in Anesthesiology edited by John Adrian M D 109 pages illustrated Charles C Thomas, Publisher Springfield Ill. 1956 Price \$3.75

This volume is a handbook summarizing the author's knowledge gained during 10 years of experience with anesthesia in cardiac surgery. The history of open thorax anesthesia is traced from the 16th century. A complete list of cardiac irregularities is classified and discussed as to cause, diagnosis, treatment and significance. The most common occurring complications during anesthesia are noted, and emphasis is placed on prevention. The anesthesiologist's role in postanesthetic management is emphasized.

Each cardiac defect for which operation is indicated is given a specific chapter. This includes the pathologic physiology, signs and symptoms, roentgenographic and electrocardiographic findings, and data found by cardiac catheterization. Criteria for selection of patients for operation are enumerated, with descriptions of preanesthetic medication.

for each type of procedure. The necessity for the cardiologist, surgeon and anesthesiologist to work as an integrated team is emphasized.

The table of contents is detailed and eliminates the need for an index. There are no pictures nor illustrations except those showing catheterization data. This book is well organized, clearly written, practical and basic. It contains a lot of worthwhile information for any anesthesiologist and is an excellent manual for teaching.

—ROBERT E. LAU, Lt Col, USAF (MC)

**LESIONS OF THE CERVICAL INTERVERTEBRAL DISC** by R. Glen Spurling, M.D. American Lecture Series Publication No. 301. A Monograph in The Bannisterstone Division of American Lectures in Surgery, edited by Michael E. DeBakey, M.D. and R. Glen Spurling, M.D. Neurosurgery Division, edited by Barnes Woodhall, M.D. 134 pages, illustrated. Charles C. Thomas, Publisher, Springfield, Ill. 1956. Price \$4.75.

This volume is another of the American Lecture Series Monographs consisting of 134 pages devoted to a concise, carefully written study of the anatomy, pathology, diagnosis and management of cervical disk disease. There is a selected bibliography which includes the classical contributions to the literature. The 41 illustrations are effective.

The chapter on anatomy is confined to the clarification of the structural features pertinent to the subject. The section on the origin and pathology of cervical disk lesions is the most interesting part of the book, and the new thinking and experimental work are reviewed in a clear, logical manner. The remainder of the book outlines the diagnosis, management and results of treatment, using case histories as effective illustrations. This latter portion of the book is a positive presentation of the author's methods and experience. Most of the views are those in common acceptance among neurosurgeons.

A portion of the discussion concerning the effects of midline disk herniation and posterior vertebral osteophytes should be required reading for all clinicians. It emphasizes the dire consequences of overlooking these amenable but often insidious lesions.

The author has succeeded in making the book appealing to all physicians who deal with this often misunderstood syndrome. The reviewer believes that this admirable monograph will become as popular and authoritative as the author's classical book, "Lesions of the Lumbar Intervertebral Disc."

—ARTHUR L. SCHULTZ, Capt, MC, USN

**PEDIATRIC CARDIOLOGY** by Alexandre S. Nadas, M.D. F.A.A.P. 587 pages, illustrated. W. B. Saunders Co., Philadelphia, Pa. 1957.

This excellent, well illustrated book is arranged in four parts for the convenience of the physician interested in a particular phase of pediatric cardiology. It is an outstanding presentation devoid of all

repetitive syndromes and obsolete teachings which have appeared in most texts during the last few generations. The congenital heart lesions are clarified and handled in a practical manner, identifying them by their anatomic and physiologic abnormalities.

The material presented is based on the author's experience during the past 10 years in the Children's Medical Center in Boston. The clinical and hemodynamic features as delineated are quite similar to those which have been observed in the Congenital Heart Clinic at Walter Reed Army Hospital, in a 6 year study of over 1200 patients.

The book expresses the teachings and experience of recognized authorities in other fields with whom the author has been associated. These include such teachers as Clement A. Smith, Dr. Edward B. D. Newhauser, Robert E. Gross, and Walter T. Goodale.

This book fills the requirement for a much needed handy text and reference book on the subject of pediatric cardiology.

—THOMAS W. MATTINGLY Col MC USA

**CLINICAL USE OF RADIOISOTOPES** by William H. Brereton M.D., Philip C. Johnson M.D., and Arthur J. Solar B.S. M.S. (Physics)  
436 pages illustrated W. B. Saunders Co., Philadelphia Pa., 1957  
Price \$11.50

This text written by the personnel of the Isotope Unit at the University of Michigan Hospital, is the result of almost 10 years of teaching experience in the field. It is directed toward the resident and practicing physician and fills a need for a basic textbook.

Most of the volume is devoted to the common uses of isotopes in today's clinical practice and each chapter includes a review of anatomy, physiology, and pathology, as well as the isotope's applications. Approximately one third of the book is devoted to the use of  $I^{131}$  in the diagnosis and treatment of thyroid problems since this is by far the most common use of isotopes today. Separate chapters discuss the use of radioactive phosphorus and gold. The use of chromium, cobalt, and iron in various diagnostic tests is particularly well described.

The only possible criticism of the book is its weakness in dosimetry which is not unusual in most of the American literature. The common instruments are discussed and their fundamental circuits are illustrated. An appendix lists the formal radioisotope training courses, but does not include the courses at Walter Reed Army Medical Center, Washington, D.C., and the National Naval Medical Center, Bethesda, Md. Courses have been conducted at these installations for a number of years for military medical officers.

This book should provide a valuable addition to the limited library that is now available to people in the isotope field.

—JAMES B. HARTGERING Lt Col MC USA



MEDICAL SCIENCES Volume I Series VII of Progress in Nuclear Energy  
 edited by J C Bugher J Coursaget and J F Loutt 165 pages  
 McGraw-Hill Book Co Inc New York N Y 1956 Price \$6

This is the Medical Science volume of a new series of eight books based primarily on the papers presented at the International Conference for the Peaceful Uses of Atomic Energy held at Geneva in August 1955. A companion volume (Series VI) on the Biological Sciences is scheduled for early release. These two volumes will highlight the several hundred papers presented in these fields and originally published by the United Nations in six volumes.

In this edition the editors have selected papers relating to the role of radioisotopes in medical diagnosis and therapy illustrating new as well as established techniques of the use of these tools both externally and internally. In addition the principles of radiation safety the development of the concept of "maximum permissible exposure" and some of the attendant administrative and legal problems are thoroughly covered. Finally G Failla has written an excellent chapter on tissue dose concepts in terms of the rad—the international unit of absorbed dose.

The selected papers include succinct reviews by leading authorities as well as heretofore unpublished techniques or special adaptations and are arranged in such a way as to present a concise and coherent picture of the present state of the art in the clinical applications of nuclear energy. Where appropriate the editors have added clarifying remarks or additions. The chapters on Diagnosis by Belcher and Weyneord and Radioactive Materials for Internal Therapy by J S Mitchell are of particular value.

For the physician who does not have access to or time to study the original volumes published by the United Nations the editors have compiled an authoritative concise and readable version.

—JAMES B HARTGERING Lt Col MC USA

COMPARATIVE ANATOMY OF THE EYE by Jack H Prince F B O A  
 F S M C F R M S F Z S (London) 418 pages illustrated  
 Charles C Thomas Publisher Springfield Ill 1956 Price \$8.50

It is interesting and refreshing to come across a book on an unusual and relatively little known phase of ophthalmology. The book is interesting to read or even just to scan and has been made especially interesting and instructive by a liberal use of tables drawings sketches and photographs.

The author confines his work for the most part to the vertebrates from fish to mammals except for a small chapter on the invertebrates. He has systematized his study on an anatomic basis comparing similar anatomic structures of representative animals in each major group including man.

The "practical" ophthalmologist will not find anything here that will help him to treat patients but the well read ophthalmologist will

find much of interest. The researcher and serious student of comparative ophthalmology will find this work a treasure. The book's value is enhanced by its comprehensive bibliography, glossary of animal names, rapid reference table and chapter on comparative ocular dissection.—*KARL D. MACMILLAN Col MC USA*

**PRACTICAL DIAGNOSIS AND TREATMENT OF LIVER DISEASE** by *Carroll Moton Leevy M D* Foreword by *Franklin M Hanger M D* Illustrations by *Felix Traugott* 336 pages 84 illustrations including 23 in full color Paul B Hoeber Inc Medical Book Department of Harper & Brothers New York N Y, 1957 Price \$8.50

The author describes a method for correlating the clinical, biochemical and histologic changes that occur in disorders of the liver so that the disease processes might be better understood and treated. This book is intended as a guide for the practicing physician. The conclusions drawn are based on results of research and experience in 1,000 consecutive cases hospitalized with various hepatic disorders.

The chapter on clinical diagnosis is excellently presented with case reports and with an explanation of each symptom of liver disease and the mechanism of its development. The various laboratory procedures and the differential diagnosis of jaundice are discussed in great detail. The author outlines those tests of function which can be most readily used by the busy clinician with a small laboratory.

There is an excellent bibliography at the end of each chapter and illustrations of the microscopic histopathology are scattered throughout the book. This is an excellent book for a student, the general practitioner and the internist.—*EDWARD P. McLARNEY Capt MC USN*

**ULTRAMICRO METHODS FOR CLINICAL LABORATORIES** by *Edwin M Knight Jr M D*, *Roderick P MacDonald Ph D* and *Jaen Ploompuu* 128 pages illustrated Grune & Stratton Inc New York N Y, 1957 Price \$4.75

There is no question but that the universal adoption of ultramicro methods in the clinical chemistry laboratory would result in the elimination of untold numbers of agonizing venipunctures.

Every laboratory director must consider the possibility of instituting ultramicro (microgram and microliter) methods especially if he is required to do blood chemistry in infants and children. This small volume will help him to make a decision and having made it help him in implementing it. The authors describe the apparatus in their own laboratory at Harper Hospital in Detroit, Mich. and their single procedure for each type of determination.

Explicit directions are given for a comprehensive battery of examinations. Well chosen references to the pertinent literature enable the reader to expand his comprehension at any desired point. The in "recipe book" tedium is relieved by short but pithy disc interpretations.

MEDICAL SCIENCES Volume I Series VII of Progress in Nuclear Energy  
 edited by J C Bugher J Coursaget and J F Loutit 165 pages  
 McGraw-Hill Book Co Inc New York NY 1956 Price \$6

This is the Medical Science volume of a new series of eight books based primarily on the papers presented at the International Conference for the Peaceful Uses of Atomic Energy held at Geneva in August 1955. A companion volume (Series VI) on the Biological Sciences is scheduled for early release. These two volumes will highlight the several hundred papers presented in these fields and originally published by the United Nations in six volumes.

In this edition the editors have selected papers relating to the role of radioisotopes in medical diagnosis and therapy illustrating new as well as established technics of the use of these tools both externally and internally. In addition the principles of radiation safety the development of the concept of maximum permissible exposure and some of the attendant administrative and legal problems are thoroughly covered. Finally G Failla has written an excellent chapter on tissue dose concepts in terms of the rad—the international unit of absorbed dose.

The selected papers include succinct reviews by leading authorities as well as heretofore unpublished technics or special adaptations and are arranged in such a way as to present a concise and coherent picture of the present state of the art in the clinical applications of nuclear energy. Where appropriate the editors have added clarifying remarks or additions. The chapters on Diagnosis by Beleher and May oerd and Radioactive Materials for Internal Therapy by J S Mitchell are of particular value.

For the physician who does not have access to or time to study the original volumes published by the United Nations the editors have compiled an authoritative concise and readable version.

—JAMES B HARTGERING Lt Col MC USA

COMPARATIVE ANATOMY OF THE EYE by Jack H Prince F B O A  
 F S M C F R M S F Z S (London) 418 pages illustrated  
 Charles C Thomas Publisher Springfield Ill 1956 Price \$8 50

*It is interesting and refreshing to come across a book on an unusual and relatively little known phase of ophthalmology. The book is interesting to read or even just to scan and has been made especially interesting and instructive by a liberal use of tables drawings sketches and photographs.*

The author confines his work for the most part to the vertebrates from fish to mammals except for a small chapter on the invertebrates. He has systematized his study on an anatomic basis comparing similar anatomic structures of representative animals in each major group including man.

The practical ophthalmologist will not find anything here that will help him to treat patients but the well read ophthalmologist will

**MEDICAL DEPARTMENT UNITED STATES ARMY** *Surgery in World War II*  
*Orthopedic Surgery in the European Theater of Operations* 397 pages  
 illustrated Editor-in Chief, Colonel John Boyd Coates Jr MC Editor  
 for Orthopedic Surgery, Mather Cleveland M D Associate Editor,  
 Elizabeth W McFetridge M A Historical Unit Army Medical Service  
 Office of the Surgeon General Department of the Army Washington 25  
 D C 1956 For sale by the Superintendent of Documents U S Govern-  
 ment Printing Office Washington 25, D C Price \$4

This excellent history of orthopedic surgery in World War II is a compilation of reports and clinical studies furnished by surgeons in the European Theater and skillfully edited by the Senior Orthopedic Consultant Colonel Mather Cleveland. Operational errors as well as successes are clearly defined and statistically recorded. Military and civilian surgeons alike will find this book of great value and timely interest.

The 397 page volume consists of three parts: administrative practices, clinical policies, and management of orthopedic injuries. The illustrations and printing are of superior quality and the type is easily read. There are two valuable appendices: the first dealing with care of battle casualty directives and the second a proposed revision of the orthopedic section of the Manual of Therapy. This section alone is well worth the thoughtful attention of every military surgeon and should be required reading.

More than 70 per cent of the casualties who survived in both world wars had wounds involving the upper or lower extremities. Considering the total troop strength in the European Theater of Operations approximated  $3\frac{1}{2}$  million men, one may appreciate the magnitude of the task which confronted the 243 military orthopedic surgeons assigned to this theater. Tribute should be paid to the two Senior Orthopedic Consultants, Colonel Rex L. Diveley MC and Colonel Mather Cleveland MC, as well as the 16 Junior Consultants for the success of the planned program and the competent treatment of bone and joint casualties.

Unfortunately, practically none of the experiences of World War I regarding the management of these injuries were put to immediate use in World War II. Treatment then was largely by the trial and error method. Review of this material by military surgeons should accomplish a great deal toward the prevention of repetition of past mistakes. The principles of management apply whether the casualties are military or civilian, and this would be especially true in case of a nuclear attack. Specific instructions are clearly presented with emphasis upon the adequate debridement of wounds, delayed primary suture of compound fractures, immediate primary suture of wounds of the hand, and proper treatment of joint injuries. As the Editor has stressed, the <sup>1</sup> word in the treatment of war wounds has not been <sup>2</sup> ~~was~~ <sup>3</sup> ~~important~~ <sup>4</sup> ~~advances~~ <sup>5</sup> ~~so arduously~~ <sup>6</sup> ~~learned in~~ <sup>7</sup> ~~not be forgotten~~ —EARL W. BRANNON Lt Col MC

It should be noted also that these techniques are widely useful in experimental studies on small animals

—ROBERT L. CRISWOLD M.D. Ph.D.

THE GIST OF OBSTETRICS by H. B. Atlee M.D. F.R.C.S. (Ed & Can.)  
F.I.C.S. Illustrated by Gail Vaughan, M.D. C.M. (Dal) 327 pages  
illustrated Charles C Thomas Publisher Springfield Ill 1957  
Price \$6

This is a new book written by the head of the Department of Obstetrics and Gynecology at Dalhousie University Halifax N.S. Canada and is the outgrowth as he states in the foreword of mimeographed notes for his students. The author makes no claim of originality of subject matter but he can claim originality of presentation and style. He presents the subject as "we" their teachers were practicing it in Halifax. The style is homely, chatty, lucid, concise and interspersed with wit and humor—a rare ingredient of modern "tomes."

This book lives up to its title. Either *good* or *modern* could properly be inserted into the title before "Obstetrics." It is hoped that this valuable book will remain what it is and not deteriorate in succeeding editions into a mediocre or second rate textbook as has happened to some of its predecessors. It is well bound, very readable, typographically and adequately illustrated with uncluttered line drawings.

The book can be highly recommended for student use and is a valuable, quick, practical source of compact, easily available information for interns, residents and general practitioners.

—ROY E. CROWDER Capt. MC, USN

THE TREATMENT OF FRACTURES by Lorenz Bohler M.D. Volume II translated from the 13th German edition by Otto Russe M.D. and R. G. B. Björnson M.D. 5th edition in English. Pages 1073 1508. Chapters 49 to 74. 941 illustrations. Grune & Stratton Inc. New York N.Y. 1957. Price \$17.50.

This entire second volume is devoted exclusively to disabilities of the femur. The first 93 pages present a thorough discussion of traumatic dislocations and gunshot wounds of the hip. Nearly 200 pages present the problems involved in femoral neck and intertrochanteric fractures. This is quite thorough and clearly points out essentials for success and reasons for failure in the treatment of these troublesome fractures. Discussion of the various other fractures of the femoral shaft and condyles, including missile fractures, comprise the remainder of the text.

It is somewhat surprising to see in print repeated recommendations for the use of heat in treating patients in shock. The assurance that femoral neck nonunions unite readily merely by performing closed reduction and nailing without any freshening of the fracture site may arouse skepticism. One case of 22 years' duration was so treated and healed solidly. Union is claimed for 87 per cent of 100 cases by this method!

Excellent illustrations are profuse and are better co-ordinated with the text than in the first volume. —WALTER R. MILLER Capt. MC, USN

**MEDICAL DEPARTMENT UNITED STATES ARMY** Surgery in Orthopedic Surgery in the European Theater of Operations illustrated Editor-in-Chief, Colonel John Boyd Coates for Orthopedic Surgery, Mather Cleveland M D A Elizabeth M McFetridge M A Historical Unit Army Office of the Surgeon General Department of the Army D C. 1956 For sale by the Superintendent of Documents Printing Office Washington 25 D C Price \$4

This excellent history of orthopedic surgery in a compilation of reports and clinical studies from the European Theater and skillfully edited by the Consultant, Colonel Mather Cleveland. Operations successes are clearly defined and statistically reviewed. Civilian surgeons alike will find this book of great interest.

The 397 page volume consists of three parts: the practices, clinical policies and management of orthopedic injuries. The illustrations and printing are of superior quality and the type is easily read. There are two valuable appendices: the first is a review of battle casualty directives and the second is a proposed revision of the orthopedic section of the Manual of The Surgeon General. This section alone is well worth the thoughtful attention of every military surgeon and should be required reading.

More than 70 per cent of the casualties who survived in both world wars had wounds involving the upper or lower extremities. Considering the total troop strength in the European Theater of Operations approximated  $3\frac{1}{2}$  million men, one may appreciate the magnitude of the task which confronted the 243 military orthopedic surgeons assigned to this theater. Tribute should be paid to the two Senior Orthopedic Consultants, Colonel Rex L. Diveley MC and Colonel Mather Cleveland MC, as well as the 16 Junior Consultants for the success of the planned program and the competent treatment of bone and joint casualties.

Unfortunately, practically none of the experiences of World War I regarding the management of these injuries were put to immediate use in World War II. Treatment then was largely by the trial and error method. Review of this material by military surgeons should accomplish a great deal toward the prevention of repetition of past mistakes. The principles of management apply whether the casualties are military or civilian, and this would be especially true in case of a nuclear attack. Specific instructions are clearly presented with emphasis upon the adequate debridement of wounds, delayed primary suture of compound fractures, immediate primary suture of open fractures, proper treatment of joint injuries. As the Editor has said, the word in the treatment of war wounds has not changed. The important advances so arduously learned in World War I should not be forgotten.—EARL W. BRANNON Lt Col

It should be noted also that these technics are widely useful in experimental studies on small animals

—ROBERT L. GRISWOLD M D Pb D

THE GIST OF OBSTETRICS by H B. Ailee M D F R C S (Ed & Can)  
F I C S Illustrated by Garth Vaughan, M D C M (Dal) 327 pages  
illustrated Charles C Thomas Publisher Springfield Ill 1951  
Price \$6

This is a new book written by the head of the Department of Obstetrics and Gynecology at Dalhousie University Halifax N S Canada and is the outgrowth as he states in the foreword of mimeographed notes for his students. The author makes no claim of originality of subject matter but he can claim originality of presentation and style. He presents the subject as we their teachers were practicing it in Halifax. The style is homely "chatty lucid concise and interspersed with wit and humor—a rare ingredient of modern tomes

This book lives up to its title. Either *good* or *modern* could properly be inserted into the title before *Obstetrics*. It is hoped that this valuable book will remain what it is and not deteriorate in succeeding editions into a mediocre or second rate textbook as has happened to some of its predecessors. It is well bound very readable typographically and adequately illustrated with uncluttered line drawings.

The book can be highly recommended for student use and is a valuable quick practical source of compact easily available information for interns residents and general practitioners.

—ROY E CROWDER, Capt MC USN

THE TREATMENT OF FRACTURES by Lorenz Bohler M D Volume II  
translated from the 13th German edition by Otto Russe M D and  
R G B. Bjornson M D 5th edition in English Pages 1073 1508  
Chapters 49 to 74 941 illustrations Grune & Stratton Inc New York  
N Y 1957 Price \$17.50

This entire second volume is devoted exclusively to disabilities of the femur. The first 93 pages present a thorough discussion of traumatic dislocations and gunshot wounds of the hip. Nearly 200 pages present the problems involved in femoral neck and intertrochanteric fractures. This is quite thorough and clearly points out essentials for success and reasons for failure in the treatment of these troublesome fractures. Discussion of the various other fractures of the femoral shaft and condyles including missile fractures comprise the remainder of the text.

It is somewhat surprising to see in print repeated recommendations for the use of heat in treating patients in shock. The assurance that femoral neck nonunions unite readily merely by performing closed reduction and nailing without any freshening of the fracture site may arouse skepticism. One case of 22 years duration was so treated and healed solidly. Union is claimed for 87 per cent of 100 cases by this method!

Excellent illustrations are profuse and are better co-ordinated with the text than in the first volume. —WALTER R. MILLER, Capt, MC USN

# UNITED STATES ARMED FORCES MEDICAL JOURNAL

*Published Monthly by  
the Armed Forces Medical Publication Agency  
Department of Defense*



*Editor*

CAPTAIN BENNETT F AVERI, MC, USN

*Associate Editors*

COLONEL ROBERT S ANDERSON, MC, USA

COLONEL PAUL V DAVIS, USAF (MC)

*Assistant Editor*

LIEUTENANT FRANKLIN M ROBERTS, MC USNR

UNITED STATES  
GOVERNMENT PRINTING OFFICE  
WASHINGTON 1957



## Monthly Message

During the past several years this office has been greatly disturbed over the failure of some of our medical schools to realize and prepare for the demands of the future upon medicine. This was brought to my attention very sharply the other day when I learned that one of our leading medical schools, with entering classes now of only 60 to 65, was planning to move and reduce its classes to a still smaller figure. With our rapidly expanding population and the many new fields of medicine with added opportunities and needs for physicians, this seems incredible. Bills are introduced into the Congress annually, expressing these needs and providing for the establishment of a Federal medical school. These bills are gaining more and more support and unquestionably part of the reason for this is the failure on the part of some of our leading medical schools to attempt to meet the pressing needs. Our universities are already making such preparations in their academic departments, and in order to retard the otherwise inevitable march of "socialized or state medicine," our medical schools also must make similar preparations.

Several years ago the State of New York took over the Long Island Medical College and the Syracuse Medical School. At that time they planned that over a definite period of years the classes in these two schools would show a steady increase up to a determined level. This is a good example of what all of our medical schools should be considering. Instead of resisting every effort to increase their classes and planning rather to reduce them, they should inaugurate a definite plan—call it by whatever name one wishes—to increase gradually the size of their classes up to calculated levels. It is far cheaper to proceed along these lines than it is to build new medical schools, and Federal aid for established schools will be more productive in a shorter space of time than will the building of a Federal medical school or schools.

Let us in medicine look forward, not backward and accept our present responsibilities and the imminent responsibilities of the future.

*Frank B. Berry*

FRANK B. BERRY  
Assistant Secretary of Defense  
(Health and Medical)

# Table of Contents

	Page
Who We Teach?— <i>Silas B. Papp</i> .....	701
Closing of Atrial Septal Defects With the Aid of Hypothermia— <i>David E. Thomas</i> .....	704
Use of Anorganic Heterogeneous Bone in Oral Bony Defects— <i>Prisla J. Boyse and Fred L. Losee</i> .....	709
Relation Plasma Pepsinogen Levels to Ethnic Origins: Implications in Duodenal Ulcer— <i>Sydney H. Croog</i> .....	795
Epidemic Rheumatic Fever Problems in Control at a Recruit Training Base— <i>Bernard M. Rees, Norman Scholes, and Harold B. Houser</i> .....	802
Beginnings of a Therapeutic Community: Establishing Group Meetings on a Closed Ward— <i>Frank L. Ruddle and Dennis L. Briggs</i> .....	811
Nonspecific Prostatourethritis— <i>Arthur N. Tessler and Jesse F. Richardson</i> .....	820
Fractures of the Femoral Shaft— <i>Richard M. Cronin and David Silver</i> .....	825
Electromyography Value in a Military Hospital— <i>Benjamin L. Crue Jr</i> .....	831
Nonspecific Epididymitis in the Military Service— <i>William M. Ross and James H. Maynard</i> .....	841
Course and Emergency Management of the National Economy.....	846
Transverse Presentation of the Fetus. A Review of the Literature— <i>Harmon H. Datch and David C. Gustafson</i> .....	847
Artificial Respiration Technique for Infants and Small Children.....	851
CLINICOPATHOLOGIC CONFERENCE	
U. S. Naval Hospital Portsmouth Va. ....	855
SERVICE ARTICLES	
Ireland Army Hospital Dedicated at Fort Knox Ky.— <i>Charles L. Eveland</i> .....	866
Role of Physicians in Recommendations of Compassionate Personnel Actions— <i>James J. Gibbs and Ralph W. Morgan</i> .....	871
Army Tests for Assessment of Intellectual Deficit— <i>Ernest K. Montague, Harold L. Williams, Arde Labov, and Charles F. Gieseberg</i> .....	883
Army Mobile Dental Clinics— <i>Harold G. O'.....</i>	893
CASE REPORTS	
Torsion of the Appendix Testis— <i>Herbert S. Friedman</i> .....	896
Pulmonary Amebiasis: Combined Resection and Medical Therapy— <i>Milton L. Brandon, H. Leonard Jones, and Horace D. Warder</i> .....	901
Fracture Following Corticotropin Therapy— <i>Wallis L. Craddock</i> .....	907
Acute Puerperal Inversion of the Uterus— <i>Jack E. Byrd and William S. Baker Jr</i> .....	913

## DEPARTMENTS

A Message From the A. M. A. ....	918
Deaths .....	920
Secretary General of World Medical Association Visits Randolph Air Force Base .....	921
Assistant Secretary of Defense Visits Military Aviation Medical Facilities .....	922
Military Surgeons Convention Chairmen Announced .....	924

## BOOKS

Reviews of Recent Book .....	926
New Books Received .....	934

## Foreword

The *United States Armed Forces Medical Journal* is the medium for disseminating information of administrative and professional interest to all medical personnel of the Department of Defense. The Assistant Secretary of Defense (Health and Medical) and the Surgeons General of the several service invite all medical officers, dental officers, Medical Service Corps officers, Nurse Corps officers, and officers of the Veterinary Corps of the Armed Forces, and the medical consultants of the Army, Navy, and Air Force to submit manuscripts for publication in this journal.

FRANK B. BERRY, M.D.

*Assistant Secretary of Defense (Health and Medical).*

MAJOR GENERAL SILAS B. HAYS

*Surgeon General, United States Army*

REAR ADMIRAL BARTHOLOMEW T. HOGAN

*Surgeon General, United States Navy*

MAJOR GENERAL DAN C. OGLE

*Surgeon General, United States Air Force*

# UNITED STATES ARMED FORCES MEDICAL JOURNAL

---

Volume VIII

June 1957

Number 6

---

## WHO, ME TEACH?

SILAS B. HAYS, Major General MC USA

**W**HY is it that so many leaders in medicine have professional appointments in medical schools and teaching hospitals? Do they hold these appointments because they are especially competent or, conversely, have they developed competence because they are actively engaged in teaching?

I think the answer to both of these questions must be in the affirmative. It is a truism that the teacher learns more than the pupil, and nowhere is this more true than in the field of clinical medicine. The teacher must consult, read, and study if he is to keep ahead of his pupil. In the discussion of a disease entity or of an individual patient, he is subject to constant question and challenge.

The teaching of clinical medicine is not, and should not be, confined to medical schools and "teaching" hospitals. Every day, all over the world, doctors get together to study and discuss individual cases with a view of determining diagnoses and methods of treatment. While sometimes these discussions or consultations are between doctors of equal professional competence, more frequently they are between a "senior" man and a "junior" man. In the Army, with its general pattern of group practice, such consultations are particularly frequent. In fact this is one of the outstanding attractions of a military medical career.

Are we in the Army making the most of these opportunities to improve our knowledge and competence and thereby improve the quality of our patient care? The solution is not to be found in

---

General Hays is the Surgeon General, Department of the Army, having held this office since 1 June 1955.

pious statements of policy, nor in directives emanating from some headquarters. It lies in the development of a teaching atmosphere in all of our medical groups. If each of us develops the habit of teaching every day, we will automatically provide better medical care for each of our patients.

Paraphrasing Shakespeare's *Twelfth Night*. Some are born teachers, some acquire teaching ability, and some have the teaching role thrust upon them. The born teacher can't keep from teaching. In every discussion and consultation he imparts knowledge. I have frequently cited my personal experience with one of our outstanding surgeons, Leonard D. Heaton. In 1932 I reported to old Tripler General Hospital which then had a small staff and far less than 100 patients. It was definitely not a "teaching" hospital. I was Captain Heaton's assistant on surgery. With Captain Heaton, every case was a teaching case and I learned something from every patient we saw together. Perhaps also some of my questions stimulated him to further reading and study. I know that I profited from every hour. Twenty three years later I watched Major General Heaton in the operating room at Walter Reed Army Hospital. He was assisting a surgical resident on a case of polyposis of the colon. General Heaton was just as he was in 1932—explaining and teaching by the "conch and pupil" method. The resident was learning surgery by the best means that has been discovered.

What about those who are not "born teachers"? Teaching skills may be acquired by those willing to take advantage of opportunities. There are only two real requisites—a knowledge of the subject and a desire to teach. It is the rare individual who finds teaching difficult or embarrassing if he meets these two requirements. On the other hand, if one is uncertain of his knowledge he is naturally reluctant to assume the teaching role. Likewise if he is not motivated to teach he loses his opportunities slide. But the inescapable fact is that teaching itself forces deeper thought and stimulates more study. Teaching is not only an altruistic action to help the other fellow. It is also a means of self advancement—a most honorable means. The best way to acquire teaching skill is to teach. It is never too early or too late to start.

What can we do about this? As Surgeon General of the Army, I am interested in constantly improving the quality of our patient care. Aside from this—and the two are inseparable—I am also interested in improving the professional stature and over all competence of all Army doctors. The difficult part of this program is that what is everybody's responsibility is usually nobody's.

responsibility. On the other hand, the easy part of the program is that everyone can do something about it either on his own or as a participant in an organized effort. The individual doctor not only can develop the teaching attitude in himself but he can help evolve a teaching atmosphere in his organization. The service chief can encourage ward rounds, conferences, journal clubs, and many other activities which center around teaching. The commander can likewise do much. He can arrange symposiums and clinical pathologic conferences and encourage talks by the staff. He can encourage timid and reticent individuals to speak in open meetings. He can invite medical officers from other units and doctors from the civilian community to attend professional meetings. He can stimulate good relationships with the local medical society and arrange for participation in programs. Often, by precept a spark thrown off from a leader will set ablaze the fire smoldering in the mind of one whose capabilities have not yet been recognized. Because good teaching further improves good patient care and elevates the competency of doctors in the Army, I am determined to constantly strengthen our teaching capabilities and facilities. Each Army hospital must have its staff actively interested in teaching and learning.

My discussion has concerned doctors of medicine, but is not restricted to them. It embraces all members of the Army Medical Service—dentists, veterinarians, nurses, psychologists, chemists and all professional groups, administrative officials, civilian employees, and enlisted personnel. Learning is unaware of rank. We all gain knowledge from our "juniors," as well as our "seniors." Enlisted personnel constantly make valuable contributions to teaching and patient care.

This is a program in which nobody loses and everybody gains the patient, the teacher, the pupil, and the Army Medical Service. I urge all to teach.

# CLOSING OF ATRIAL SEPTAL DEFECTS WITH THE AID OF HYPOTHERMIA

DAVID E. THOMAS *Lieutenant Colonel MC USA*

**A**TRIAL SEPTAL defects which are possibly the most common of the isolated congenital anomalies of the heart, have been treated by a variety of closed operative techniques. Gross and associates<sup>1</sup> used a rubber "well" attached to the right atrium and, as a result of the low pressure in this chamber were able, working through a pool of blood, to leisurely close the atrial septal defect with sutures. Bailey and co-workers<sup>2</sup> used a method involving inversion of the atrial tip into the septal defect, blindly suturing it in this position. Søndergaard's<sup>3</sup> technic consisted of dissecting in the interatrial septum between superior and inferior vena cava and, with a finger in the auricle for guidance, passing a needle with suture about the defect. This suture was tied by the assistant; the operator's intracardiac finger checking on the closure obtained.

Of these methods, that of Gross seems most practical but all are deficient in that visualization is not possible. It is well known that atrial septal defects are often cribriform and it is not unusual to find a large defect with several small ones. Inadvertent failure to close all defects must occur in any method not done under visualization. In addition, detection and correction of associated anomalies such as pulmonary venous drainage into the right auricle is possible under visualization, and the coronary sinus may be protected from partial or complete occlusion by a suture.

Lewis and Taufic<sup>4</sup> reported the first successful case of interatrial surgery under direct vision during hypothermia in 1952. Since then numerous reports have appeared in the literature. Swan and his group<sup>5</sup> have been particularly prominent in this field and we are indebted to them for leadership and guidance at this hospital. It would seem obvious that if the operation can be performed with a mortality comparable to that of the closed technics, repair of interatrial septal defects by direct

---

*From Fitzsimons Army Hospital, Denver, Colo. Col. Thomas is now assigned to Valley Forge Army Hospital, Philadelphia, Pa.*

vision under hypothermia is the procedure of choice and will yield a higher percentage of successful closures. With this objective in mind, let us evaluate our results.

### METHOD

**This study** includes 18 operations from 1953 through 1956. Two of those were reoperations. Seventeen were performed with the aid of hypothermia and 1 with the bubble oxygenator described by Dollall and associates.<sup>6</sup> The technique of cooling and operation has been thoroughly described by Salzer, Lyter, and Pollock<sup>7</sup> and will not be repeated.

**Age at Operation.** Ages varied from 4 to 38 years. Ten patients were less than 10 years of age, 4 were 20 to 30, and the remaining 4 were 30 to 38 years of age.

**History.** In general, a history of retarded growth, dyspnea on exertion without cyanosis, and frequent respiratory infections was obtained. The lack of cyanosis is to be expected, because the shunt is from left to right. The severity of symptoms varied from asymptomatic, the lesion being discovered as the result of a prenatal examination, to very severe with marked limitation of activity.

**Physical Findings.** The patients were generally underdeveloped and underweight. The left anterior portion of the chest may be prominent and a thrill or shock is often felt in the pulmonic area. The heart is enlarged to percussion. A soft systolic murmur is heard along the left sternal border. The second heart sound is duplicated and loud, and a soft diastolic murmur may be present.

**Roentgenograms.** There was increased vascularity of the lung fields, enlargement of right auricle and ventricle, posterior displacement of the esophagus by the right auricle on barium swallow and, on fluoroscopy, increased pulsation of the pulmonary artery.

**Cardiac Evaluation.** Electrocardiograms often showed incomplete right bundle branch block and evidence of right ventricular hypertrophy. Cardiac catheterization revealed evidence of a left to right shunt at the atrial level with increased oxygenation of the blood. Mild to marked right ventricular and pulmonary artery hypertension was frequent. Pulmonic to systemic circulation ratios ranged to a high of 4 to 1.

### RESULTS

Table 1 lists the complications of the procedure in our series. There were 2 deaths in 18 procedures, a mortality rate of 11



per cent. Neither of these deaths were considered to be a result of hypothermia. One was due to bronchopneumonia on the third postoperative day. The other was first thought to be caused by pulmonary embolism the patient dying suddenly on the day she was to leave the hospital. This impression was not confirmed by autopsy, which showed no definite cause of death. Inasmuch as she exhibited ventricular fibrillation during the operation and developed auricular flutter which responded to digitalis and quinidine during the postoperative period it was believed that she probably died as a result of ventricular fibrillation.

TABLE I Complications

Ventricular fibrillation	4
Atelectasis	2
Pneumonitis	2
Bronchopneumonia	1
Bilateral common peroneal palsy	1
Incomplete closure	1

Incomplete closure was diagnosed in a 5 year old boy when he failed to improve following surgical intervention. Reoperation was successful.

Of the remaining complications the only one of importance was the bilateral common peroneal palsy. This unusual complication occurred in a 29 year-old man who required four electric shocks at 165 volts for 0.1 second to stop ventricular fibrillation during the operation. He had anomalous pulmonary venous drainage into the right auricle from the right lung. The ventral portion of the atrial defect was sutured to the right auricular wall on the right side of the anomalous pulmonary veins thereby shifting the venous return to the left auricle. In spite of the e problems circulation occlusion did not exceed 5 minutes which is well within the safe range. This patient is exhibiting a slow return of function but still requires foot-drop braces.

Anomalous right pulmonary venous drainage was diagnosed preoperatively in another patient as a result of catheterizing a right pulmonary vein during cardiac catheterization. This additional defect was remedied by the method previously described with good result. Artificial oxygenation with the bubble oxygenator was used during this series. No septum primum defects were encountered in this series.

The other reoperation was on a patient who had previously had a polyethylene button sutured over the defect under hypothermia.

at another hospital. At operation at this hospital, the button was found to be covered with endothelium, but one suture had pulled out. The button was resutured with good result.

Follow up evaluation is available on 13 patients. Eleven of them report weight gain, increased strength and vigor, and unlimited activity. One patient has residual symptoms from peroneal palsy and one, diagnosed preoperatively as having a psychogenic musculoskeletal disorder without true cardiovascular symptoms, reports no postoperative improvement.

### COMMENTS

Rapid advances in cardiac surgery during recent years have posed the problem of comparing various techniques and selecting the one best suited for correction of a specific anomaly. This small series of cases indicates that under direct vision with the aid of hypothermia, atrial septal defects can be closed successfully and completely with an acceptable mortality rate. The postoperative improvement of the patients is uniform and gratifying. The open heart method of repairing this defect is considered to be technically superior to any of the closed methods. Necessary intracardiac manipulations can be completed well within the eight minute safe period of vascular occlusion. In fact, the operations on these patients were all completed within five minutes, insofar as the intracardiac portion of the procedure was concerned. It is possible to repair the defect in three minutes in a straightforward case with a foramen ovale type of central defect. It has never been necessary to do so, but, should the time within the open heart approach eight minutes, the procedure could be temporarily interrupted, circulation and respiration be reestablished, and the heart be reentered after an adequate interval.

Air embolism has not been a problem, because the left heart is flooded with physiologic saline solution through the defect just prior to tying the last suture. The right auricle and ventricle are similarly flooded prior to clamping off the incision in the auricular wall. The coronary arteries are protected from air embolism by placing the clamp that occludes the aorta and pulmonary artery low enough to occlude the coronary ostia.

Ventricular fibrillation has been a problem, but not an insurmountable one in this series. For the past year, we have injected Novocain (brand of procaine hydrochloride) into the sinoauricular node area, as recommended by Riberi, Sideris, and Shumacker,<sup>4</sup> but a firm opinion of the value of this procedure has not been formed. Fibrillation has occurred after Novocain injection of the S A node area. Ventricular fibrillation is ignored

during the open heart portion of the procedure but massage is started as soon as the incision in the right atricular wall is clamped. Massage and electrical defibrillation have been successful in restoring normal rhythm. Intracardiac injections of dilute epinephrine and calcium chloride solution are occasionally used as auxiliary measures. We have not employed intracoronary infusions of potassium solutions to induce cardiac standstill.

### SUMMARY

Atrial septal defects have been treated by a variety of closed operative techniques. Direct visualization during operation permits (1) more complete closure of the defect, (2) detection and correction of associated anomalies such as pulmonary venous drainage into the right atrium and (3) protection of the coronary veins from partial or complete occlusion by a suture.

From 1953 through 1956 16 operations for closure of atrial septal defects were performed under hypothermia at this hospital. There were two postoperative deaths. One on the third postoperative day resulted from bronchopneumonia. The other at the time the patient was ready to leave the hospital probably was caused by ventricular fibrillation.

This small series of cases indicates that under direct vision with the aid of hypothermia, atrial septal defects can be closed successfully and completely with an acceptable mortality rate. The postoperative improvement of the patients was uniform and gratifying. The open heart method of repairing this defect is considered to be technically superior to any of the closed methods.

### REFERENCES

1. Gross, R., and Pomeroy, R. E., and Trench, E. J., and Goussard, E. L. Septal closure of defects of interatrial septum by use of atrial wall. *New England J. Med.* 254: 446, Sept. 28, 1956.
2. Bailey, C. P., Drivings, D. F., Gross, R. G. D., Lüdt, T., Goldberg, H., Scott, J. C., Jett, O., and Zelenko-Pantzer, H. P. Experimental interatrial communication: clinical and surgical considerations with description of new surgical techniques. *Ann. Int. Med.* 57: 889-900, 1962.
3. Stenquist, T. Closure of atrial septal defects: report of 3 cases. *Acta chir. Scandinav.* 174: 492, 1956.
4. Lewis, J., and Telford, M. Closure of atrial septal defects with aid of hypothermia: experimental accomplishments and report of one successful case. *Surgery* 57: 249, Jan. 1964.
5. Swan, H., Zervin, L., Fawcett, S. G., Jones, V., and Vane, J. V. Surgery by direct vision on open heart during hypothermia. *J. A. M. A.* 171: 295, Nov. 2, 1953.
6. DeVall, E. A., Telford, H. E., and, R. C. Gott, V. L., Ziegler, N. R., Vane, J. V., Lister, C. S., and, P. Cook, B. E. Artificial oxygenator for open heart surgery. *S. Clin. North Amer.* 33: 36, Jan. 1958.
7. Sayre, J. H., Lister, C. S., and, P. Cook, B. E. Experience in surgical management of atrial septal defects and pulmonary stenosis under hypothermia. *Ann. Surg.* 152: 422, 1960.
8. Pomeroy, R., Sturge, H., and, Shumacker, H. B., Jr. Ventricular fibrillation in hypothermia: state prevention by sinoatrial node blockade. *Ann. Surg.* 144: 216-222, Feb. 1957.

# USE OF ANORGANIC HETEROGENOUS BONE IN ORAL BONY DEFECTS

PHILIP J BOYNE, *Lieutenant Commander DC USN*

FRED L LOSEE *Captain, DC USN*

**T**HE organic fraction of bone may be removed by extraction with ethylenediamine, with a minimum of alteration in the structure and composition of the inorganic component<sup>1,2</sup> The resulting osseous product, consisting of a porous crystalline and noncrystalline lattice, has been termed "anorganic bone" and has served as a successful foundation for new bone growth in defects of the long bone of dogs<sup>3</sup>

This pilot study was undertaken to evaluate clinically the use of animal inorganic bone in patients undergoing selected oral surgical procedures It was thought that a clinical evaluation of the oral tissue response could be obtained by implanting anorganic cortical bovine bone particles into bony defects following relatively minor operative procedures

Boyne and Losee<sup>1-3</sup> found that the placing of anorganic bovine bone particles in surgically created bony defects of the mandible and maxilla of rhesus monkeys was followed by uneventful clinical healing with a complete absence of any evidence of a foreign body reaction Histologic specimens of the implanted defects demonstrated reactive bone formation surrounding the anorganic particles as early as 13 days postoperatively The anorganic particles were rapidly remodeled with new bone formation from the host tissue

It is believed that on the basis of this previous experimental work on the rhesus monkey, ethylenediamine extracted animal bone offers a new source of osseous tissue which could be applied to many oral surgical procedures as a substitute for fresh autogenous bone, banked homogenous bone, or various alloplastic materials

Such a substitute is particularly applicable to the military service where there is need of an inexpensive, readily avail

---

From Dental Service Naval Dispensary Department of the Navy Washington O C and Dental Division Naval Medical Research Institute National Naval Medical Center Bethesda Md

able source of osseous tissue for use in the treatment of traumatic injuries in the event of a national emergency.

The purpose of this study was not to compare anorganic animal bone implants with autogenous or homogenous bone transplants but merely to establish whether the implanting of anorganic bone particles into oral bony defects of man would be followed by the same clinical and roentgenographic pattern as that observed in the monkey following the filling of similar defects with the same material.

A total of 16 anorganic heterografts were placed in various types of bony defects. Three of these implants were placed in the bone cavities following the enucleation of radicular cysts, 6 were placed in periapical bony defects following endodontic therapy and periapical curettage, 3 were placed following enucleation of nasopalatine duct cysts and 6 were placed in the bone alveoli following tooth extraction. In all patients healing was uneventful. postoperative edema and ecchymosis were minimal and no untoward reactions were observed. In no case was there any clinical evidence of foreign body response by the oral tissues. In some patients immediate denture prostheses were inserted over the operated areas without discomfort to the patient and the tissues healed rapidly beneath the prosthetic appliances.

The length of the postoperative follow up period varied from 10 to 20 weeks. Roentgenograms taken 6 weeks postoperatively demonstrated a tendency toward uniformity of bone density between the grafted areas and the surrounding bone, the development of an apparently normal trabecular pattern was demonstrated in the latter part of the postoperative course.

Two representative cases are briefly reported to demonstrate the use of this material.

### CASE REPORTS

**Case 1** A 32 year-old man first reported to the dental clinic with the complaint of "pain and swelling of the upper jaw." A preoperative roentgenogram (fig. 1) disclosed a large radiolucent area in the edentulous right maxilla extending from the apex of the right cuspid tooth medially to join another radiolucent area in the midline of the maxilla. At operation these cystic areas in the maxilla were enucleated and anorganic bovine bone particles were implanted in the bony defects. The left lateral incisor and the right cuspid were removed. A partial denture was inserted over the area at the time of the operation. On microscopic examination the cystic areas proved to be a radicular and a nasopalatine duct cyst. Figure 2 is a roentgenogram taken one week postoperatively. A roentgenogram made six weeks postoperatively



*Figure 1 (case 1) Preoperative roentgenogram demonstrating large radiolucent area in edentulous right maxilla.*



*Figure 2 (case 1) Roentgenogram taken one week after enucleation of cysts and implantation of anorganic bone particles*

(fig. 3) revealed a tendency toward uniformity of density of the osseous tissues. None of the implanted bone particles had been extruded or exfoliated. Clinically, the edentulous ridge was firm and well healed.



Figure 3 (case 1). Appearance on roentgenogram six weeks postoperatively.



Figure 4 (case 2). Operative site showing bony defect following enucleation of cyst.

**Case 2.** A radicular cyst involving the left upper central and lateral incisor teeth of a 24 year old man was enucleated by periapical curettage. The bony defect remaining after the enucleation is shown in figure 4. It was possible to retain the involved teeth by endodontic therapy. Figure 5 shows the operative site following the placing of anorganic bovine bone particles in the bony defect. The mucoperiosteal tissues were closed over the implanted bone particles. Healing was uneventful.



*Figure 5 (case 2) Operative site after placing anorganic bone particles in the bony defect*

#### SUMMARY AND CONCLUSIONS

The organic portion of bovine bone was extracted with ethylenediamine. Particles of the remaining anorganic bovine bone were used as grafts in 18 bony defects created by relatively minor oral operative procedures. The bony defects in each case were slightly underfilled and a close adaptation of the mucoperiosteal flap was obtained. The absence of any inflammatory response clinically and the retention of the graft, without extrusion or exfoliation of the graft particles, were indicative of initial clinical host acceptance.

Limitations, both in the number of cases reported and in the length of the follow up periods, preclude the establishing at this time of any definite conclusions as to the ultimate fate of



(fig 3) revealed a tendency toward uniformity of density of the osseous tissues. None of the implanted bone particles had been extruded or exfoliated. Clinically the edentulous ridge was firm and well healed.



Figure 3 (case 1) Appearance on roentgenogram six weeks postoperatively



Figure 4 (case 2) Operative site showing bony defect following enucleation of cyst

**Case 2.** A radicular cyst involving the left upper central and lateral incisor teeth of a 24 year old man was enucleated by periapical curettage. The bony defect remaining after the enucleation is shown in figure 4. It was possible to retain the involved teeth by endodontic therapy. Figure 5 shows the operative site following the placing of anorganic bovine bone particles in the bony defect. The mucoperiosteal tissues were closed over the implanted bone particles. Healing was uneventful.



*Figure 5 (case 2) Operative site after placing anorganic bone particles in the bony defect.*

#### SUMMARY AND CONCLUSIONS

The organic portion of bovine bone was extracted with ethylenediamine. Particles of the remaining anorganic bovine bone were used as grafts in 18 bony defects created by relatively minor oral operative procedures. The bony defects in each case were slightly underfilled and a close adaptation of the mucoperiosteal flap was obtained. The absence of any inflammatory response clinically and the retention of the graft, without extrusion or exfoliation of the graft particles, were indicative of initial clinical host acceptance.

Limitations, both in the number of cases reported and in the length of the follow up periods, preclude the establishing at this time of any definite conclusions as to the ultimate fate of

these implanted anorganic heterografts. The absence of any clinical evidence of foreign body reaction on the part of the host, however, and the character of the postoperative roentgenograms indicate a pattern of host acceptance similar to that found in animal experimentation (implantation of anorganic bone in the long bone of dogs and in oral bony defects of monkeys).

Anorganic bone is easily manipulated. It may be kept at room temperature and need not be stored under sterile conditions or in an antibiotic solution, because it is autoclaved just before its use in an operation. This material appears to be adaptable to the surgical techniques used for the insertion of autogenous or banked homogenous bone particles in bony cystic defects of the oral cavity (*e g* freeze dried homogenous bone<sup>7</sup>).

It is believed that further studies on the clinical and roentgenographic long term status of anorganic bone grafts will indicate a definite application of this material to many oral surgical procedures.

#### REFERENCES

- 1 L. S. C. F. L. and Hurley L. A. Successful cross species bone grafting accomplished by removal of donor tissue from Naval Medical Research Institute Project NM 004 006 09 01 Dec 3 1956
- 2 L. S. C. F. L. and Hurley L. A. B. treated with ethyl o-dimio successful foundation material in cross species bone graft. *Nature* 177 1032-1033 June 2 1956
- 3 Boyne P. J. and Lose F. L. Response of oral tissues to grafts of ethyl o-dimio treated heterogenous bone. Naval Medical Research Institute Research Report NM 004 006 09 In press
- 4 Boyne P. J. and Lose F. L. Response of oral tissues to grafts of ethyl o-dimio-treated heterogenous bone. *Nature* 179 818 Apr 20 1957
- 5 Boyne P. J. and Lose F. L. Printed Abstract No. 232 for the 35th General Meeting of International Association for Dental Research Atlantic City N. J. Mar 1957
- 6 Coles D. E. Clinical and animal experiments to investigate the healing properties of freeze-dried material in cyst of the jaw. Thesis Georgetown University Graduate School 1954
- 7 Boyne P. J. Treatment of extracranial cysts with freeze-dried homogenous bone graft. *J Oral Surg* 14 206-212 July 1956

# RELATION OF PLASMA PEPSINOGEN LEVELS TO ETHNIC ORIGINS

## Implications in Duodenal Ulcer

SYDNEY H. CROOG, *First Lieutenant MSC USAR*

**R**ECENT research has indicated that 87 per cent of patients with duodenal ulcer have higher blood plasma pepsinogen concentrations than do normal subjects.<sup>1</sup> In addition, it has been suggested that under appropriate circumstances, persons with comparatively high levels of serum pepsinogen are more likely than others to develop duodenal ulcer.<sup>2</sup> Although further study is necessary to establish and clarify the exact nature of this phenomenon, the elevation of plasma pepsinogen may prove useful in the diagnosis and possibly in the prediction of duodenal ulcer.

The present article reports an effort to determine whether certain specific ethnic groups in the population differ significantly in their serum pepsinogen level. This study is preliminary to future analysis of relationships between elevated pepsinogen level, duodenal ulcer, and personal and social factors. The relationships may indicate how further investigation of pepsinogen and ulcer should proceed. Reports on the relation of ethnic origins and pepsinogen to duodenal ulcer are rare in the literature for this is a recent line of inquiry. The incidence of ulcer in various nations and racial groups has been reported,<sup>3-6</sup> however, differences in methods and in thoroughness of compilation preclude extended comparison.

### METHOD

Two thousand newly inducted soldiers were chosen at random from the processing center at Fort Dix, N. J., during an eight week period in the fall of 1954. All were young men who had recently been subjected to several physical examinations and were presumed to be in good health. Their mean age was 21.1

---

From Walter Reed Army Institute of Research, Walter Reed Army Medical Center, Washington, D. C. Dr. Croog is now at The Children's Hospital, 300 Longwood Ave., Boston, Mass.

years. As new basic trainees all were faced with the stresses and uncertainties involved in military induction.

Of the total sample of 2,000 men 1,900 qualified for inclusion in the present study by fulfilling these criteria: (1) All were born in the continental United States, (2) each contributed a blood sample which was analyzed for pepsinogen, and (3) each completed a sociologic questionnaire designed by the author. From this number the selection of ethnic subpopulations was made.

Blood samples were sent daily for determination of plasma pepsinogen levels. A numerical "pepsinogen score" was obtained by expressing the proteolytic activity of the plasma as micrograms of "tyrosine" released by the action of 1 ml of plasma at pH 1.5 in the standard assay procedure.

The sociologic questionnaire consisted of items dealing with the social background of the inductee, his parents and his grandparents. Both the blood samples and the sociologic questionnaires were identified by code numbers. Sociologic material and the pepsinogen scores were held separate until the final phase when both sets of information were transferred to IBM cards.

Ethnic groups were differentiated solely on the basis of operationally defined traits. Those inductees who on the sociologic questionnaire identified both parents as being of a specified ethnic origin were included in that group. Inductees who recorded the religion of both parents as Jewish at birth were included in the Jewish sample, and men who listed both parents as of the Negro race were classified as belonging to the Negro sample. The Negroes are obviously a racial group, but for the sake of brevity, the term "ethnic group" is used throughout this article for the Negro as well as for the other four subpopulations.

Five groups were selected. In order of size they were of the following origins: Jewish (347), Italian (302), Irish (212), German (91), and Negro (64). They totaled 1,016 men representing an approximate 50 per cent of the original random sample. The majority of inductees, with the exception of the Jews and Negroes, reported that three or four of their grandparents were born in the specific country of national origin, with the remainder reporting that at least one grandparent was born there. The majority of Jewish inductees also recorded the European birth of all four grandparents. The Negroes were the only men whose grandparents were virtually all of native American birth.

The locale where the research was done, Fort Dix, N. J., affected the ethnic composition of the sample. Men processed

through Fort Dix are primarily from the northern United States, an area in which a variety of recent immigrant groups are concentrated.

A large proportion of the sample, moreover, was made up of men from urban centers of population, 42 per cent, for instance, were from New York City. Less than 2 per cent came from rural or farm areas. Eighty per cent of the total sample came from two states, New York and New Jersey, with the majority of the remaining men originating in New England states.

The entire sample of 1,900 men for whom data on both pepsinogen and social background were available was classified into deciles in terms of pepsinogen level. From the total population the five special groups of inductees were selected by means of criteria already described. The distributions of scores for these groups were then subjected to statistical analysis.

### RESULTS

When the mean scores for one of the ethnic groups are examined, differences in elevation of pepsinogen level are apparent. In table 1 the groups are ranked in terms of size of the mean. The mean for the Irish inductees is the highest, while the Italians and Jews are the two lowest groups in terms of mean pepsinogen score. The range between means for the Irish and Jewish groups is from 422 to 518 points, a difference of almost 100. The difference between the highest mean, the Irish, and the second highest, the Negro, is a spread of 68 points. On the other hand, with the exception of the Irish means of all the groups are clustered within a range of 28 points; the range between the means of the Jewish and Negro groups.

TABLE 1 *Plasma pepsinogen levels of ethnic groups*

Nationality	Number in sample	Mean plasma pepsinogen	Standard deviation	Level of significance of F ratio when compared with Irish
Irish	212	518	226.6	Not significant $p < 0.01$ $p < 0.001$ $p < 0.001$ $p < 0.001$
Negro	64	450	219.5	
German	91	444	188.5	
Italian	302	432	199.3	
Jewish	347	422	179.0	

Expressed as micrograms of  
of plasma in the standard assay

by the activity of 1 ml

years. As new basic trainees all were faced with the stresses and uncertainties involved in military induction.

Of the total sample of 2 000 men, 1 900 qualified for inclusion in the present study by fulfilling these criteria (1) All were born in the continental United States (2) each contributed a blood sample which was analyzed for pepsinogen and (3) each completed a sociologic questionnaire designed by the author. From this number the selection of ethnic subpopulations was made.

Blood samples were sent daily for determination of plasma pepsinogen levels. A numerical "pepsinogen score" was obtained by expressing the proteolytic activity of the plasma as micrograms of "tyrosine" released by the action of 1 ml of plasma at pH 1.5 in the standard assay procedure.

The sociologic questionnaire consisted of items dealing with the social background of the inductee, his parents and his grandparents. Both the blood samples and the sociologic questionnaires were identified by code numbers. Sociologic material and the pepsinogen scores were held separate until the final phase when both sets of information were transferred to IBM cards.

Ethnic groups were differentiated solely on the basis of operationally defined traits. Those inductees who on the sociologic questionnaire identified both parents as being of a specified ethnic origin were included in that group. Inductees who recorded the religion of both parents as Jewish at birth were included in the Jewish sample and men who listed both parents as of the Negro race were classified as belonging to the Negro sample. The Negroes are obviously a racial group but for the sake of brevity the term "ethnic group" is used throughout this article for the Negro as well as for the other four subpopulations.

Five groups were selected. In order of size they were of the following origins: Jewish (347), Italian (302), Irish (212), German (91) and Negro (64). They totaled 1 016 men, representing an approximate 50 per cent of the original random sample. The majority of inductees, with the exception of the Jews and Negroes, reported that three or four of their grandparents were born in the specific country of national origin, with the remainder reporting that at least one grandparent was born there. The majority of Jewish inductees also recorded the European birth of all four grandparents. The Negroes were the only men whose grandparents were virtually all of native American birth.

The locale where the research was done, Fort Dix, N. J., affected the ethnic composition of the sample. Men processed

ences in the birthplaces of grandparents or parents did not significantly affect pepsinogen scores for the Irish group

**Relation of Social Variables to Pepsinogen Levels** In the literature on ulcer a number of studies cite social variables such as occupation, mobility, family structure, and other factors as being of significance.<sup>8-14</sup> In the light of these writings, an effort was made to test the significance of a number of variables in the total sample population and within each of the three largest groups, the Irish, Italians, and the Jews. On the assumption that a high pepsinogen level implies particular proneness to duodenal ulcer, the purpose was to determine whether men in certain broad social groupings or social situations might have higher scores than others. The Index of Status Position and an occupational scale devised by Professor August B. Hollingshead of the Department of Sociology, Yale University, were used.

The following items were examined in relation to pepsinogen level: (1) occupation of the inductee before entering the Army, (2) educational level of the inductee, (3) occupation of the father, (4) social class of the father, (5) occupational ambitions of the inductee in relation to his father's occupation as an index of mobility, and (6) differences between parents and the inductee regarding the occupational ambitions of the youth. No significant statistical relationships were found. The negative results indicate that (1) either no relationships exist between pepsinogen level and the individual variables examined or (2) the techniques used were not sufficiently sensitive to detect such a relationship.

### COMMENTS

While the Irish inductees were found to have significantly higher pepsinogen scores than the other groups, the meaning and implications of the results are not clear. Obviously, it is not simply the fact of being of Irish national origin which underlies the results, but rather that the Irish have certain traits in common more than any other group in the sample. These traits presumably are causal or influential in producing elevated levels of plasma pepsinogen. The literature contains a wide variety of hypotheses concerning the origins of ulcer, ranging from theories on genetic, constitutional, dietary, neurologic and endocrine factors, to explanations in terms of emotions and the unconscious mind. Within this theoretical setting the precise identification of the variables which lead to high pepsinogen levels is an additional area for rigorous empirical work.

Replication of research is a basic principle in the development of theory in science. In the present study, the development of theory is hindered by the lack of replication.



the groups particularly the Negro group, makes repetition of the study desirable. However, since the exploratory work indicates significant differences between certain groups it is possible for future investigations to concentrate on underlying variables while at the same time duplicating the study.

Because the Irish appear to be a special group in terms of plasma pepsinogen the research might conceivably be repeated with comparative ease in Ireland where large samples are available. The essential test of measuring plasma pepsinogen can be set up as a routine matter of laboratory procedure. Similarly research might be performed in Italy and among Jews of eastern European origin in Israel as these represent groups with low mean levels of pepsinogen.

One of the ultimate aims of research in this area is the validation of the proposition that high pepsinogen level is an indication of the likelihood of developing duodenal ulcer. Accordingly an ideal study would be concerned with the actual incidence of ulcer within subcultural groups which exhibit elevated plasma pepsinogen levels. Either a longitudinal approach or a latitudinal study with selected age levels might be used. From multidimensional research answers may emerge to clarify some of the current medical problems and controversies concerning the origins, course, and therapy of duodenal ulcer.

### SUMMARY

Comparisons of plasma pepsinogen levels in five operationally defined ethnic groups were made in order to determine differences in pepsinogen score. The underlying assumption based upon reports in the literature was that elevated levels of blood pepsinogen are indicative of a tendency to develop duodenal ulcer. The five groups consisted of 1,016 Army inductees who passed through the processing center at Fort Dix, N. J.

The mean pepsinogen score of the inductees of Irish origin was the highest of the five groups, differing significantly from the scores of the German, Italian, and Jewish men. The Negro group, however, stood in an intermediary position between the Irish and the others, differing significantly from none of them. Lowest pepsinogen level scores were found among the Italian and Jewish inductees. The implications of the results were discussed with emphasis on the advisability of repeating the study in the individual countries of national origin.

### REFERENCES

- L. Mirsky, L. A. Fatterman, P. and Kaplan, S. Blood plasma pepsinogen, activity of plasma from "normal" subjects, patients with duodenal ulcer, and patients with pernicious anemia. *J. Lab. & Clin. Med.* 40: 188-199 Aug. 1952.

2. Weiner H, Thaler M, Reiser M, and Minsky L A. Etiology of duodenal ulcer: relation of specific psychological characteristics to rate of gastric secretion (serum pepsinogen). Presented at the annual meeting of the American Psychosomatic Society Boston Mass. March 25 1956. To be published
3. Alsted, G. *Studies on the Changing Incidence of Peptic Ulcer of the Stomach and Duodenum*. Oxford University Press London 1939
4. Centinen M. Sulla incidenza della malattia ulceroa gastro-duodenale negli operai di un grande complesso industriale [Incidence of gastroduodenal ulcer in workers of large industrial center] *Scilia Sanitana* 7 247-250 Apr 1954
5. Reihner V A. Peptic ulcers in Africans of French Cameroons. *J Internat. Coll Surgeons* 25 289-298 Mar 1956.
6. Steigmann F. Peptic ulcer syndrome in Negro clinical and statistical evidence on psychogenic as against racial factors in etiology of this syndrome. *Am. J Digest Dis & Nutrition* 3 310-315 July 1936.
7. Thompson, H. Investigation into postmortem incidence of peptic ulcers and erosions. *Glasgow M J* 35 326-334 Nov 1954.
8. Wretmark G. Peptic ulcer individual, study in heredity physique and personality. *Acta psychiat et neurol scandinav* (supp. 84) pp 1-123, 1953.
9. Doll R, Jones F A, and Buckatzsch M M. *Occupational Factors in Aetiology of Gastric and Duodenal Ulcers With an Estimate of Their Incidence in the General Population*. Medical Research Council Special Report Series, No. 276. His Majesty's Stationery Office London England, 1951
10. Kellock T D. Childhood factors in duodenal ulcer. *Brit M J* 2 1117-1120 Nov 10 1954.
11. Rucsch J and others. *Duodenal Ulcer A Sociopsychological Study of Naval Enlisted Personnel and Civilians*. Contributions from Division of Psychiatry University of California Medical School and Langley Porter Clinic. University of California Press Berkeley Calif. 1948.
12. Rucsch J. Social technique social status and social change in illness in Kluckhohn, C. and Murray H. A. *Personality in Nature Society and Culture*. Alfred A. Knopf, Inc. New York N Y 1949
13. Steigmann F. Peptic ulcer syndrome in Negro Clinical and statistical evidence on psychogenic as against racial factors in etiology of this syndrome. *Am. J Digest Dis & Nutrition* 3 310-315 July 1936.
14. Sallstrom, T. Regarding occupational factors in gastric ulcer and duodenal ulcer. *Acta med. Scandinav* 120 340-348 1945

# EPIDEMIC RHEUMATIC FEVER

## Problems in Control at a Recruit Training Base

BERNARD M REEN *Captain USAF (MC)*

NORBERT SCHALET *Captain USAF (MC)*

HAROLD B HOUSER *M D*

**T**HE EXACT nature of the well known relationship between group A streptococcal infections and rheumatic fever has not been established. In a recent discussion of the pathogenesis of rheumatic fever McCarty<sup>1</sup> pointed out many of the unanswered problems concerning the role of the streptococcus. Fortunately although these problems exist preclusion of rheumatic fever by either prophylaxis or adequate therapy of streptococcal infections is well recognized. The principles of prevention of recurrent rheumatic fever are well accepted and practicable; however, they are more difficult to apply for the prevention of initial attacks.

As shown by studies at the Streptococcal Disease Laboratory, Francis F. Warren Air Force Base, Wyo.,<sup>2,3</sup> first attacks of rheumatic fever can be prevented when the preceding streptococcal infections are adequately treated with penicillin or broad spectrum antibiotics. Hubbard<sup>4</sup> recently discussed the difficulties of preventing initial attacks in the general population and suggested that the "captive population" at a military installation would be an ideal group in which to treat acute streptococcal infections for prevention of rheumatic fever.

Experience at Sampson Air Force Base during the winter of 1954-1955 has shown that even in a military population, prevention of first attack rheumatic fever by treatment of streptococcal disease leaves much to be desired. This article outlines

---

From Laboratory on Housing and Illness, Armed Forces Epidemiological Board, and Department of Medicine, State University of New York, Upstate Medical Center, Syracuse, N. Y., and Preventive Medicine Section, U. S. Air Force Hospital, Sampson Air Force Base, N. Y.

This investigation was conducted under sponsorship of the Committee on Acute Respiratory Disease, Armed Forces Epidemiological Board. It was supported by the Office of the Surgeon General, Department of the Army and Air Force and in part by funds provided under contract with the U. S. Air Force School of Aviation Medicine, Randolph Field, Tex.

some of the difficulties in such a program and the specific measures employed at this base to reduce the incidence of rheumatic fever

### MATERIALS AND METHODS

Simpson Air Force Base, situated in an endemic streptococcal region in central New York State, was a primary basic training base for recruits. The average trainee population varied from 10,000 to 22,000 men.

A throat culture was obtained from all patients admitted to the base hospital with respiratory disease. Strains of beta hemolytic streptococci isolated from these cultures were identified by Lancefield group and type.

The hospital charts of all patients with a discharge diagnosis of acute rheumatic fever with an onset between 4 November 1954 and 1 August 1955 were reviewed. The diagnostic criteria employed in this review were those of Jones,<sup>4</sup> with evidence of recent streptococcal infection as an additional minor criterion. Admittedly, some cases of acute rheumatic fever with mild manifestations were excluded, but the application of these criteria assured us of a measure of uniformity in the series.

In order to include only patients with rheumatic fever who were likely to have developed their preceding streptococcal infections at this base, cases of rheumatic fever occurring less than 10 days after a man's arrival were excluded. In addition, no rheumatic fever patients received here by air evacuation from other bases were included. Permanent party personnel from this base were not included in the analysis.

### RESULTS

Of 122 discharge diagnoses of rheumatic fever during the study period, 98 met our criteria and are included here. Seventeen of the remaining 24 probably were rheumatic fever with mild manifestations. The other seven were excluded as permanent party, air evacuees, or on the basis of a different diagnosis. The time of onset of the disease in the 98 patients was ascertained from the recorded history and is presented in figure 1.

The hospital admission rate of patients exhibiting ten or more colonies of group A streptococci on admission throat culture is shown in figure 2. Although some of these persons may have been carriers, it is thought that in most instances the admission was for streptococcal pharyngitis. The predominant type of group A streptococcus throughout the study period was 19

Examination of figure 2 shows that the rate for streptococcal pharyngitis rose rapidly

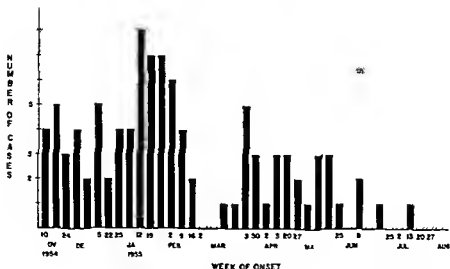


Figure 1 The occurrence of acute rheumatic fever at a recruit training base November 1954 to August 1955

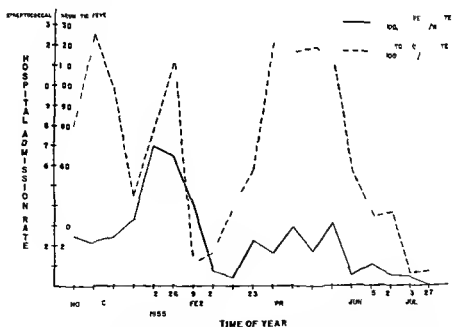


Figure 2 Hospital admission rates for streptococcal pharyngitis and rheumatic fever at a recruit training base November 1954 to July 1955

to a peak of 12.5 cases per week per 1,000 men dropped remarkably in late December coincident to the Christmas and New Year's leave period, and then rose rapidly to a peak of 11.3 by 26 January. At this point penicillin prophylaxis was ad-

ministered on a base wide scale, and the rate dropped off precipitously. The results of this prophylaxis will be presented in detail elsewhere.<sup>7</sup>

The rate began to rise again in the early weeks of March and reached a peak of 12.7 by early April. This rate was sustained until mid June and thereafter fell off to negligible levels for the summer.

The coincident rate of rheumatic fever is also presented in figure 2. It can be seen that the rate rose with the increased hospital admissions for streptococcal disease, reaching a peak of 70.2 cases per week per 100,000 men by 12 January 1955, and fell off at the time of penicillin prophylaxis. Two weeks after the streptococcal rate again began to rise, the incidence of rheumatic fever began to increase. Although the streptococcal hospitalization rate again reached proportions similar to those earlier in the season, the concomitant rise in rheumatic fever was less than earlier. The reasons for this observation merit close scrutiny.

#### DISCUSSION

Several possible explanations for the failure of the rheumatic fever rate to parallel the streptococcal rate in the second half of our reporting period present themselves. The factor of host susceptibility to beta hemolytic streptococcal infections has long been discussed. Certainly some families have a higher rheumatic fever incidence than the normal population, and the tendency of rheumatic fever subjects to have recurrences of their disease is well recognized. These people might then be considered to have an increase in host susceptibility to rheumatic fever. Without debating the point of familial factors in rheumatic fever, they would seem to be of little importance in explaining the difference in rheumatic fever response to the streptococcal rates in the two periods of our series. In a population as large and heterogeneous as that dealt with at a military training base, the proportion of susceptible persons should be similar at any time throughout the year. As far as recurrent rheumatic fever is concerned, such cases accounted for proportionately as many admissions in the period before penicillin prophylaxis as in the period after it.

The effect of season on the incidence of rheumatic fever might be a factor in the observed differences, but the weight of evidence indicates that the seasonal variation merely reflects the seasonal incidence of streptococcal infections.<sup>8</sup> Another explanation of the observed variation might be the presence of a particularly virulent rheumatogenic strain of streptococcus in

the early part of the winter. This seems unlikely in view of the fact that there was no type change in the streptococci responsible for disease during the two periods. In addition there is little evidence that group A strains vary in their rheumatogenic capacity. We believe that the disparity in the streptococcal and rheumatic fever rates during the second half of the winter can be explained best as the result of specific measures which were instituted.

It must be remembered that these streptococcal rates represent only hospital admissions and are not a true measure of the total streptococcal disease on the base. If we assume that the patients with streptococcal disease recognized in the hospital were adequately treated then we can expect up to 90 per cent reduction in the development of rheumatic fever in this group. In fact, only 3 of the 98 patients with rheumatic fever seen during the winter had been hospitalized for a preceding streptococcal infection. Of these, two had received three and four days of penicillin therapy, respectively while the third had not received any penicillin. We believe that the remainder of the patients with rheumatic fever seen during the winter had had streptococcal infections that were undiagnosed and untreated or if diagnosed were inadequately treated without admission to the hospital.

If as is generally accepted about 3 per cent of untreated patients with group A streptococcal infections will develop rheumatic fever<sup>10</sup> then any given group of patients with rheumatic fever can be considered to be 3 per cent of the total number of those who had undiagnosed or inadequately treated streptococcal infections 2 to 3 weeks prior to the onset of the rheumatic fever. From this assumption, it is then possible to estimate the total number of cases of streptococcal disease present in a group. Figure 3 shows a comparison of the hospital admission rate in this series with the assumed incidence of streptococcal pharyngitis among the total recruit population. The assumed rate was calculated by adding to the hospitalization figures the number of cases that must have occurred to account for the rheumatic fever that developed. To allow for the latent period the cases assumed to have occurred to account for the incidence of observed rheumatic fever have been moved back two weeks from the time of onset of the rheumatic fever.

It can be seen from figure 3 that during the weeks prior to penicillin prophylaxis a great many cases of streptococcal infections were either not recognized or inadequately treated on a dispensary level. Little more than one quarter of the estimated cases of streptococcal disease reached the hospital whereas

after the period of penicillin prophylaxis, over 50 per cent of the estimated streptococcal cases were hospitalized and adequately treated

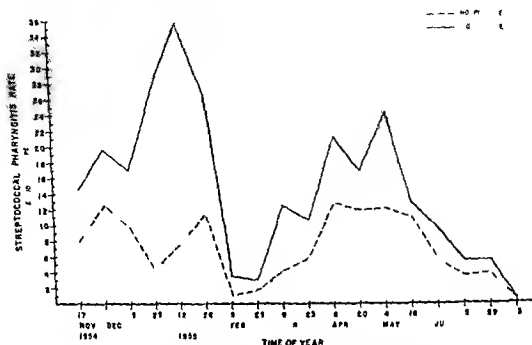


Figure 3 Hospital admission rate and assumed total rate for streptococcal pharyngitis in recruits, November 1954 to July 1955

We believe that several factors, some of which are peculiar to a military population, were responsible for this increase in the detection and treatment of streptococcal disease

1 The tendency of the trainee with minor respiratory complaints to refrain from reporting to sick call accounted for many of our untreated streptococcal cases. This is illustrated in figure 2, where the streptococcal hospitalization rate fell so precipitously during the period approaching the Christmas and New Year's leave time. Perhaps a decrease in population with a decrease in exposure rates could account for some of this decline, but the absence of a decrease in rheumatic fever and the decline in admissions before leaves actually began indicate that this was not an important factor. The decrease in hospitalization rate for streptococcal infections must be attributed largely to the reluctance of the trainee to present himself on sick call and face possible hospitalization in lieu of the holiday leave.

During the early weeks of January, an intense educational campaign was initiated to encourage the trainee to appear at sick call when even minor symptoms occurred. It is believed that as a result, many streptococcal infections were seen, diag-



nosed, and treated which would otherwise have run their natural course as mild untreated cases

2 A second and probably more important factor was the improper treatment of recognized streptococcal cases. This became evident from interviews with patients hospitalized with rheumatic fever. In several instances, the correct diagnosis had been made but the prescribed course of therapy was too short to prevent the nonsuppurative complications. Present evidence indicates that eradication of the infecting organism from the throat is necessary if rheumatic fever is to be prevented.<sup>10</sup> For the most effective eradication of the streptococcal organism, penicillin blood levels must be maintained over a 10 day period.<sup>11</sup> This was re-emphasized to all medical officers.

A practical therapeutic problem in the protracted treatment of streptococcal infections on a dispensary level lies in the tendency of the trainee to be governed by his symptoms. He will be told to return for additional penicillin injections or to continue taking penicillin by mouth for 10 days, but all too frequently with the subsidence of his acute symptoms he will discontinue therapy after 3 to 4 days. This sequence of events accounted for a considerable portion of rheumatic fever in the early part of the winter. This was eventually corrected by admitting patients with streptococcal infections to the hospital for treatment.

3 The last and we believe the most important factor in curbing the untreated streptococcal rate, was the institution of a policy whereby all patients who fulfilled the criteria of a temperature of 100°F or above or who had purulent pharyngitis regardless of temperature were admitted to the hospital. It has been pointed out by many that if only the clinical case which presents the classical picture of streptococcal pharyngitis is treated an alarming proportion of streptococcal disease is missed. Breeso and Disney<sup>12</sup> stated an accuracy of diagnosis on clinical grounds of 75 per cent in both positive and negative cases when checked against bacteriologic cultures. It is our experience that this degree of accuracy can hardly be expected at an installation such as this. Ideally a system of throat cultures for suspected cases must be instituted.

By admitting all patients who fulfilled these criteria of elevated temperatures or purulent pharyngitis we were able to obtain throat cultures and retain those with streptococcal disease in the hospital for a course of penicillin therapy. Long acting penicillin in large enough quantity was not available to us at that time. Had it been available a throat culture system on out-patient status with one injection of benzathine penicillin would

1-1-1947

## EPIDEMIC RHEUMATIC FEVER

have been instituted. This should be an equally effective less expensive method of detection and treatment of streptococcal disease.

With the limitations imposed by the lack of a single penicillin treatment for streptococcal disease, the practice of hospitalization proved valuable in reducing the untreated streptococcal disease rates and in preventing many cases of rheumatic fever. However even in our "captive population" and in special emergency treatment of recognized streptococcal disease cases of rheumatic fever still occurred in the postprophylactic period. Prophylaxis of streptococcal infections thus seems to be the only practical way at present to reduce the incidence of rheumatic fever to a satisfactory rate.

I still remain of the opinion of the physician to recognize streptococcal infections so that an incipient epidemic is apparent and prophylaxis can be instituted without delay. The physician should not wait until the occurrence of many cases of rheumatic fever alerts him to the presence of a streptococcal epidemic.

## SUMMARY

The problem of controlling streptococcal disease and rheumatic fever is a large military installation is not at all simple. To effect a large-scale program for adequate prevention of the consequent complications of streptococcal disease co-operation for many sources is requisite.

It should be continually borne in mind that satisfactory eradication of the streptococcus is more a factor of the duration of medication with penicillin than of the amount administered.

Trainees should be improved with the necessity of appearing as sick call for even minor throat and respiratory complaints.

Because of difficulty in effecting the return of the ambulatory trainee for further penicillin therapy after his symptoms have subsided, best results can be obtained by treating persons with streptococcal pharyngitis in the hospital except that if benzathine penicillin is available, hospitalization probably is not necessary for the treatment of persons with mild infections.

By instituting more strict criteria for the hospitalization of patients with respiratory disease, many cases of streptococcal infection in our camp, which would otherwise have gone unrecognized, were discovered and treated with a long-acting one injection treatment. It has been available and the result as we obtained with hospitalization could have been expected.

on an outpatient basis by taking cultures from the throats of all those who met these criteria

## REFERENCES

- 1 McCarty M. Present state of knowledge concerning pathogenesis and treatment of rheumatic fever *Bull. New York Acad. Med.* 28: 307-320 May 1952
- 2 Wannamaker L. W., Rammelkamp C. H. Jr., Denny F. W., Brink W. R., Hooser H. B., Hahn E. O. and Dingler J. H. Prophylaxis of acute rheumatic fever by treatment of preceding streptococcal infection with various amounts of depot penicillin. *Am. J. Med.* 10: 63-695 Jan 1951
- 3 Hooser H. B., Eckhardt G. C., Hahn E. O., Denny F. W., Wannamaker L. W. and Rammelkamp C. H. Jr. Effect of aureomycin treatment of streptococcal sore throat on streptococcal carriage, the immunologic response of host and incidence of acute rheumatic fever *Pediatrics* 12: 593-606 Dec. 1953.
- 4 Catanzaro F. J., Brock L., Chamvitz, R., Petry W. D., Sigel A. C., Stetsed, C. A., Rammelkamp C. H. Jr., Hooser H. B., Stoller B. L., Wannamaker L. W. and Hahn E. O. Effect of oxytetracycline therapy of streptococcal sore throat on incidence of acute rheumatic fever *Ann. Int. Med.* 4: 345-357 Feb 1955
- 5 Hubbard J. P. Prevention of first-attack rheumatic fever *Ann. Int. Med.* 43: 504-510 Sept. 1955
- 6 Jones T. D. Diagnosis of rheumatic fever *J. A. M. A.* 116: 481-484 Oct. 21 1944
- 7 Hooser H. B., Cryns W. F., Goodrich C., Reen B. M. and Fritz, R. Comparative effect of oral penicillin G and intramuscular benzathine penicillin on endemic streptococcal pharyngitis To be published.
- 8 Rammelkamp C. H. Jr., Wannamaker L. W. and Denny F. W. Epidemiology and prevention of rheumatic fever *Bull. New York Acad. Med.* 28: 321-334 May 1952
- 9 Hooser H. B. and Eckhardt G. C. Recent developments in prevention of rheumatic fever *Ann. Int. Med.* 37: 1035-1043 May 1952
- 10 Committee on Prevention of Rheumatic Fever and Bacterial Endocarditis. Prevention of rheumatic fever and bacterial endocarditis through control of streptococcal infections *Circulation* 11: 317-330 Feb 1955
- 11 Beyer B. B. and Denny F. A. Accuracy of diagnosis of beta hemolytic streptococcal infection on clinical grounds *J. Pediatr.* 44: 670-673 Jun 1954

# BEGINNINGS OF A THERAPEUTIC COMMUNITY

Establishing Group Meetings on a Closed Ward

FRANK L RUNDLE *Lieutenant MC USNR*  
DENNIE L BRIGGS *Lieutenant MSC USN*

THAT the closed admission ward of a psychiatric service in a military hospital can be operated as a "therapeutic community" in accordance with the principles of social psychiatry developed in England,<sup>1</sup> has been demonstrated and reported by Wilmer.<sup>2,3</sup> He described his experiences in operating an acute admission ward without use of traditional suppressive and restraining measures, particularly quiet rooms and sedation. The results were impressive and the prospect of using similar methods under other circumstances was appealing. It seemed that such a method of ward management and patient treatment would be ideally suited to the operation of the closed ward in this overseas naval hospital.

Having had no experience in group therapy and lacking more detailed information than that appearing in Wilmer's article, the senior author, who was Ward Medical Officer, was reluctant to initiate such an undertaking. However, with the aid of the junior author, who was a clinical psychologist and had had such experience, the program of establishing the closed ward as a therapeutic community was begun. In this article some of the practical problems involved during the first six weeks of that program will be discussed.

## INITIAL CONDITIONS

The physical arrangement of the closed ward presented great disadvantages, as it had not been originally planned as such and the facilities were far from adequate. The ward was long and narrow with a capacity, including three quiet rooms of 33 patients. There was a small enclosed courtyard at the rear where patients could play basketball and volleyball. Patients were not allowed off the ward except in the custody of a corpsman and at the spe-

---

From the U S Naval Hospital Yokosuka Japan

cific order of a medical officer Except for playing hall and a daily movie on the ward, the only entertainment and recreation for the patients was provided by the Red Cross

Prior to the initiation of the therapeutic community program nurses were not regularly assigned to the closed ward Usually the nurse on an adjacent ward covered the closed ward as well being there only briefly to dispense medications and care for administrative details At nights it was covered by the supervisor who usually had six wards to cover

The hospital corpsmen on the ward had had no formal training in the care of psychiatric patients or in the management of a psychiatric ward All had volunteered to work on the neuropsychiatric service Most of them were basically friendly and understanding in their dealings with patients, but there were some who were so insecure and felt so threatened that they needed to use means of physical restraint

This is the only fully staffed naval hospital West of Guam and serves naval and Marine Corps personnel in Korea Japan Okinawa Formosa and aboard ships operating in the encompassed areas The average monthly psychiatric admission rate is about 70 patients Patients frequently arrive without prior consultation with our staff hence many are admitted when consultation would suffice Frequently high prisoners from the surrounding activities are sent for admission for little other reason than not being able to accept their status as prisoners Sometimes of necessity acutely intoxicated and disturbed individuals are admitted to the ward overnight because there is no other place to put them Frequently persons involved in administrative or legal action because of homosexuality are admitted for administrative reasons Patients who have made a suicidal gesture or attempt are usually common due to special factors and circumstances in the Far East

All the above factors caused the ward population to be extremely heterogeneous and often difficult to manage and adversely affected therapeutic aims in some instances

### INITIATING THE NEW PROGRAM

The only preparations made for initiating the "new regime" as it came to be known were these (1) The bunks on the ward were rearranged so a large enough area could be provided for the patients and staff to be seated in a circle (2) The corpsmen were told that we were about to try something new in the way of ward management and that the objective was to abolish suppressive techniques and place as much responsibility as possible for control and management upon the patient both individually and

collectively (3) Patients and staff were informed that a meeting would be held on the ward every morning except Sunday and that everyone would be expected to attend

There were 26 patients on the ward when the new program began. Those patients had been on the ward in some instances for only a day, and in one case for six months. Twelve patients were diagnosed as schizophrenic, 3 as having a neurotic depressive reaction, and 1 as having an anxiety reaction. The remaining 10 were classified as having character and behavior disorders.

**Plan of the Day** The working day on the ward began at 0745 hours when the staff doctors and nurse interviewed newly admitted patients. Sick call followed, and the group meeting took place soon thereafter and lasted 45 minutes. A staff meeting followed the patient meeting, in which the group meeting was analyzed and pertinent information about the behavior of the patients on the preceding day was discussed. A report from the night corpsmen was made known to the staff.

**The First Group Meeting** For the first meeting, the physician, the clinical psychologist, the nursing supervisor, a recently assigned ward nurse, 2 Red Cross workers, the master at arms, 6 hospital corpsmen, and 23 patients were gathered in a circle in the rear of the ward. Three patients absolutely refused to attend the meeting.

The meeting was opened by the Ward Medical Officer who stated that the group would meet daily six times per week for 45 minutes, and that all present were invited to use this opportunity to express their feelings about the way the ward was run, to ask questions, and to bring up any personal problems with which they desired help.

The first patient to speak was the one who had been on the ward the longest (six months) and who was tacitly recognized as the leader by most of the patients. This patient asked why the radio couldn't be located at the rear of the ward rather than at the nurses' station and why the corpsmen considered it dangerous to have it in the limited recreation area. One patient, half sarcastically and with insight into some of the staff's attitudes remarked, "We are all emotionally unstable and can't be expected to control ourselves," and then got up and nervously paced the floor for the remainder of the meeting. Another patient declared to the group that now that a nurse would be regularly assigned to the ward, the patients would have to watch their language. At another time a patient asked if a quiet hour could be observed, and after considerable discussion by the group it was decided that due to weekday activities such a quiet hour could be observed only on Sundays.

cific order of a medical officer. Except for playing ball and a daily movie on the ward, the only entertainment and recreation for the patients was provided by the Red Cross.

Prior to the initiation of the therapeutic community program nurses were not regularly assigned to the closed ward. Usually the nurse on an adjacent ward covered the closed ward as well being there only briefly to dispense medications and care for administrative details. At nights it was covered by the supervisor, who usually had six wards to cover.

The hospital corpsmen on the ward had had no formal training in the care of psychiatric patients or in the management of a psychiatric ward. All had volunteered to work on the neuropsychiatric service. Most of them were basically friendly and understanding in their dealings with patients but there were some who were so insecure and felt so threatened that they needed to use means of physical restraint.

This is the only fully staffed naval hospital West of Guam and serves naval and Marine Corps personnel in Korea, Japan, Okinawa, Formosa and aboard ships operating in the encompassed areas. The average monthly psychiatric admission rate is about 70 patients. Patients frequently arrive without prior consultation with our staff hence many are admitted when consultation would suffice. Frequently brig prisoners from the surrounding activities are sent for admission for little other reason than not being able to accept their status as prisoners. Sometimes of necessity acutely intoxicated and disturbed individuals are admitted to the ward overnight because there is no other place to put them. Frequently persons involved in administrative or legal action because of homosexuality are admitted for administrative reasons. Patients who have made a suicidal gesture or attempt are unusually common due to special factors and circumstances in the Far East.

All the above factors caused the ward population to be extremely heterogeneous and often difficult to manage and adversely affected therapeutic aims in some instances.

#### INITIATING THE NEW PROGRAM

The only preparations made for initiating the new regime<sup>o</sup> as it came to be known were these: (1) The bunks on the ward were rearranged so a large enough area could be provided for the patients and staff to be seated in a circle. (2) The corpsmen were told that we were about to try something new in the way of ward management and that the objective was to abolish suppressive techniques and place as much responsibility as possible for control and management upon the patient both individually and

require every patient to attend. We then found that those who formerly refused would attend without overt resistance. It appeared that an important part in their subsequent change in attitude was due to our providing them with an acceptable reason to save face and join the community, which apparently they had wanted to do all along.

The problem of attendance at meetings now rarely causes difficulty, but when it does come up with individual patients, it always has significance and is brought up in the meetings. Once in a while, if a patient refuses to attend, the group waits for him and the leader does not allow the meeting to proceed until all are present. The other patients will usually convince the patient that he should be there, an appeal to courtesy and good behavior is frequently all that is necessary.

**Seating** The area used for the meetings should be fairly small so as to encourage patient and staff to sit close to each other and to allow each to be visible to all. This in itself fosters social control as each member of the group is under scrutiny by all others. Despite all efforts to maintain group solidarity in seating, some patients and staff tend to occupy positions indicative of their resistance or need to avoid scrutiny. Permitting persons to sit on table tops, on the floor, and behind objects allows them to remain outside the group physically as well as psychologically and to escape being members of the group. It is desirable for the staff to disperse themselves in the group to meet the immediate needs of the patients, however, it was often obvious that they placed themselves in accordance with their own needs.

If a patient is resistive or upset, a staff member may personally extend an invitation to the patient to sit by him in the meeting. Initially some of the staff did not sit, but stood in the fringes of the group. After repeated fruitless discussions in staff meetings this matter was finally resolved simply when the leader on one occasion offered a corpsman his chair. We believe that the leader should sit in the same position at each meeting but that the rest of the staff should distribute themselves throughout the group. The patients soon seem to reserve the same position for the leader and we believe it symbolically provides some bit of security upon which the insecure patient can depend. On one occasion when the leader had to be absent from the meeting, the senior corpsman carried on the meeting, sitting in the leader's chair, which resulted in the expression of good natured indignation.

**Time** Our groups met for 45 minutes 6 days per week, and we adhered to the beginning and ending times quite strictly. At



The general tone of the meeting was lively and at times several persons spoke at once. In addition there was laughter and sarcasm, and some patients held private conversations with other patients and with staff members. The Ward Medical Officer interceded to encourage order and recognition of a single speaker. Throughout the meeting there was a display of real interest in improving ward conditions, but the revealing of personal feelings and problems was minimal.

Afterward the staff assembled in a small office on the ward and recounted the events of the meeting just held. The ward physician, psychologist, and nurses felt encouraged and optimistic, but most of the corpsmen seemed skeptical. The corpsmen later explained that they initially believed their position of authority and means of control of the patients were in jeopardy.

**Subsequent Group Meetings.** In the succeeding weeks the group meetings continued to develop in the direction of open and free discussion. Initially considerable time was spent in questioning and evaluating past restrictive measures and in some cases deciding to change them. Immediate interpersonal entanglements, both between patients and between patients and staff, were more freely aired as time passed. As the atmosphere of receptiveness and tolerance of discussion developed more and more problems of an inner personal nature were introduced. At the end of six weeks the period covered by this article the group meetings were effectively utilized in working out difficulties between individuals, problems of ward management, and personal problems of considerable intensity and importance.

### IMMEDIATE PROBLEMS

The following points that arose in the first six weeks of operating the closed ward as a therapeutic community are considered to be of importance for others who might be interested in starting such a program but who are lacking in experience, as was the senior author. Some of the errors made in beginning this undertaking, from the standpoint of the mechanics of running the daily groups, will be discussed.

**Attendance.** We did not insist initially that every patient attend the meetings, but strongly urged them to do so, stating that we expected everyone to attend. We found that attendance must be required in the operation of a community type treatment program as the feelings and behavior of every patient and staff member influence the others. We found that those patients who refused to attend thus not allowing their attitudes and actions to be considered and inspected by the community were those who caused the most difficulties on the ward. We eventually realized that we had to exercise our military prerogative as officers and

tant single treatment procedure for the day and required that the staff participate as a treatment team and attempt to hold possible distractions to a minimum. The group leader should never answer the telephone or leave the group meeting, except in absolute emergency. He should allow no staff member or patient to leave except if unavoidable. Patients always noticed closely which staff members attended and often commented on their presence or absence both during the meetings and outside them.

**Withdrawal** Except in rare instances, patients were not permitted to withdraw or leave the group. If a patient became angry and left the group we waited to see if another patient would attempt to retrieve him, if not, a staff member would try. If these means were not successful, the leader would always go after the patient, and in few instances has a patient refused to return. When he returned, the matter was discussed and the group attempted to help him control himself and his anger more adequately. In one instance, an aggressive, angry patient made a lunge for the door as a corpsman was opening it, making loud angry statements to the group. A nurse, with no prior training or experience in psychiatry, went after the patient and brought him back to the group and held his arm gently for the remainder of the meeting. Previously his scuffles had required several corpsmen to help him gain control of himself.

**Aggressive Behavior** Occasionally, tempers flared and erupted and patients verbally or more rarely physically (once during this period) attacked other patients. A sharp verbal attack can usually be handled by promoting ventilation and making interpretations of obvious factors involved. Physical violence must, if necessary, be physically constrained by the staff in a matter of fact, nonhostile manner, then, if possible, the person's feelings should be discussed.

**Relaxation of Old Restrictive Measures** A great part of the initial group discussions concerned the questioning and re-evaluation of old restrictive measures such as are practiced on most closed psychiatric wards. As much as was possible, the group was encouraged to arrive at their own decision as to whether such measures were any longer necessary. However, in some cases the medical officer found it necessary to contradict group opinion and decision concerning such matters, because of administrative necessity or because of his own philosophy of treatment. Events subsequent to the period with which this article deals demonstrated that external control measures can be safely relaxed only gradually as patient group solidarity and acceptance of responsibility for individual actions are developed. Perhaps it would be even more important that the staff feel confident and unthreatened by changing of security measures.

## SUMMARY AND CONCLUSIONS

Some of the immediate problems encountered in the initial phases of establishing a therapeutic community type of management and treatment on a closed psychiatric ward in an overseas military hospital have been discussed. This article was prepared to give others who are inexperienced in methods of community therapy some idea of the more concrete problems arising in the undertaking.

The immediate goals in using the therapeutic community approach were to (1) improve ward management by dealing openly with patient staff tensions and resentments and the adjustment of patient staff roles and relationships which this involved, (2) prepare patients for continued treatment and hospitalization by acculturating them to the hospital (3) promote realistic acceptance by patients of their roles as patients, and (4) encourage patients to take an active part in their own treatment and that of other patients. These goals have been attained in general.

Through the therapeutic community method, the number of acute management problems occurring on the ward has been greatly reduced and except for occasional use of the quiet rooms for acutely disturbed drunk patients the need for restraint has been entirely eliminated. Informal communications received from other hospitals to which some of our patients have been evacuated indicate that many of them take their hospitalization more seriously and work harder in their treatment than do patients from most hospitals. In some instances they reportedly assisted the other patients in learning to accept their status. Long range plans for using this method of treatment at this hospital include development of procedures for returning more patients to duty from this command and improving the condition of those who require evacuation to the United States for further treatment.

It is possible by applying therapeutic community techniques to materially improve the over all quality of patient care particularly as regards socio environmental aspects of treatment, on the psychiatric service in a military hospital not designated a "treatment center." It appears that continued use of traditional suppressive management because of inadequate facilities lack of trained staff and rapid turnover of patients is not justifiable considering that all these disadvantages were initially present in this case and did not prevent the successful use of the therapeutic community method. Of primary importance in an undertaking such as described herein is that the staff have a sincere interest in and a genuine desire to help people. Specialized technical training is not essential although provisions for training ward personnel within the program are important. Absolutely

essential is a general attitude on the part of the staff which embodies kindness, understanding, sincerity, and an unflinching conviction of the worth and dignity of the human being

---

**ACKNOWLEDGMENT** The authors are grateful to Captain Ira C. Nichols, MC USN and Commander Harry A. Wilmer, MC USN for their encouragement and advice and to the Nurse Corps and Hospital Corps personnel and Red Cross workers for their co-operation in this study

#### REFERENCES

- 1 Briggs D. L. and Stearns L. Developments in social psychiatry observations in 5 selected English hospitals *U S Armed Forces M J* 8 184 194 Feb 1957
  - 2 Wilmer H. A. Psychiatric service as therapeutic community *U S Armed Forces M J* 7 640-654 May 1956
  - 3 Wilmer H. A. Psychiatric service as therapeutic community 10 month study in care of 939 patients *U S Armed Forces M J* 7 1465 1469 Oct 1956
- 

#### PSYCHOLOGY OF HIGHWAY SAFETY

"Understanding and possibly controlling the human factors of drivers (e g their attitudes and personal adjustments) as well as the driver's equipment and environment (e g the design of his automobile) provide the most promising areas to prevent automobile accidents. Though no single characteristic of drivers has yet been isolated that appears to be outstanding in accounting for the large proportion of accidents on the highways there do appear to be several etiological groupings. One of these is the accident repeater who may manifest general instability in society or even possess a mild psychopathic personality. As in the control of other epidemics we must find means of identifying the most important variables relating to the "host," as well as the "agent" and the environment. Physicians can play an important role in such an approach."

—ROSS A. McFARLAND Ph D  
in *Journal of American Medical Association*  
p 233 Jan 26 1957

# NONSPECIFIC PROSTATOURETHRITIS

ARTHUR N TESSLER *Lieutenant MC USNR*

JESSE F RICHARDSON *Captain MC USN*

**N**ONGONOCOCCAL urethritis is the term used in recent literature to describe the presence of a urethral discharge not associated with intracellular diplococci of gonorrhea.

It has also been called nonspecific, or less commonly, nonvenereal urethritis. Its etiology, pathogenesis and pathology is but partially understood.

The discharge is most frequently mucopurulent or milky, but varies from frankly purulent to mucoid. It varies from profuse to scant and usually is associated with dysuria of varying degrees, particularly in or near the urethral meatus. Less frequently the patients complain of frequency, urgency, and pain in the perineum. Microscopic examination of the discharge reveals pus cells and bacteria, usually gram positive,<sup>1</sup> in various concentrations.

Treatment of this condition is empirical and clinical relapses have plagued all military medical officers. There are many reasons for delay in better understanding of this misnamed disease but some of them can be overcome. We wish to relate our experiences with this disorder, suggest improvements in therapy, and to suggest new methods of study.

## INCIDENCE

It is impossible to report the accurate incidence of this disease because it is not a reportable disease in most areas. Only since 1952 has it been a reportable disease in the United States Navy. During the years 1953 to 1955 approximately 20,000 cases have been reported annually in the Navy and Marine Corps.<sup>1</sup> This represents approximately 2 per cent of the men in the services. Interpolated for the remaining services, the resultant figure re-emphasizes the magnitude of the problem for this non-serious "entity."

From the number of articles on the subject originating within the medical departments of the armed services compared with the scarcity of both articles, and apparently cases, from our

---

From U S Naval Hospital St Albans Long Island N Y Dr Tessler now at  
4 Bayside Drive Great Neck N Y

civilian population, we must infer that something inherent in military life is important in the etiology of this disease. Two thirds of the cases reported in the Navy and Marine Corps<sup>2</sup> were personnel assigned to ships, 28 per cent were men stationed in noncontinental United States stations, and 7 per cent were men in the continental United States. The incidence among shipboard personnel was from 3 to 4 per cent, among personnel at overseas stations, 4 per cent, and among men in the States, the incidence was 0.3 per cent. The incidence varies geographically, but it is so universal as to rule out a "vector of limited geographical habitat."

### ETIOLOGY AND PATHOGENESIS

One cannot fail to be impressed with the concept of venereal transmission of nonspecific prostatourethritis. Whenever a new group of servicemen arrives in an endemic area, new cases occur. Almost invariably, those afflicted have had sexual intercourse, without the use of a mechanical prophylaxis, some 10 days to 3 or more weeks prior to the onset of symptoms. Although some authors hesitate to accept the venereal concept, none has expressed any doubt as to the infectious origin of the disease. Numerous organisms have thus far been incriminated—staphylococci,<sup>3</sup> diphtheroids, pleuropneumonia like organisms<sup>4</sup> and others, but no causal relationship to any has thus far been established.<sup>5,6</sup>

The absence of a predominating organism that can be cultured and retransmit the disease does not rule out a bacterial origin, but does suggest a nonbacterial origin, and a need for new culture and staining techniques. Penicillin prophylaxis has been implicated as a possible causative factor because of the rise in incidence of nongonococcal urethritis concomitant with its use. A more realistic reappraisal, however, centers attention upon the sexual indiscretion of servicemen receiving such prophylaxis. The role of alcoholism has also been discussed. It has long been known that imbibed alcohol is partially excreted in the urine and acts as an irritant, particularly in an already inflamed bladder or urethra. This is the reason for restricting its use during convalescence. Drinking is often associated with sexual exposure.

### PATHOLOGY

It is difficult to study the morbid anatomy of nonfatal diseases and one must depend upon "fortuitous" circumstances for specimens because biopsy is not indicated except under controlled research. However, one can easily observe the injection of the terminal urethra directly and the remaining urethra with panendoscopy. The frequent boggy and tenderness of the prostate is palpable and the changes in prostatic secretions observable with the laboratory microscope. The frequency of prostatic in-

involvement has been reported as 73 per cent by Ambrose and Taylor.<sup>1</sup> Our experience has been similar to theirs. For this reason we agree with Wolf and associates<sup>7</sup> who suggested that this disease is a prostatourethritis.

### THERAPY

At present therapy is empirical. Most widely employed is a combination of antimicrobial agents, dietary restrictions of alcoholic beverages, condiments and caffeine containing drinks, and often sexual restrictions. When prostatic involvement is recognized massage of the prostate is employed. We concur with the use of antimicrobials, dietary restrictions, and massage but not with complete restriction of sexual activity. During the acute phase of disease fear and anger usually restrain the patient from sexual activity, and it is only during the acute inflammatory phase that such restrictions are indicated. It is unrealistic even with the "Simon Pure" to avoid sexual stimulation and certainly the group afflicted is not Simon Pure. The resulting prostatovesicular engorgement adds to prostatic disturbances that are manageable by massage but are more completely relieved by natural means. Patients with chronic prostatic inflammation and obstruction of the prostatic acini, if married, should be encouraged to have a natural and active sexual life.

Although we employ antimicrobial agents, we know of no study of the natural history of the disease in a large series of patients. Ambrose and Taylor, in their small series of 41 cases, found that 3 patients recovered spontaneously without therapy and 3 patients had persistent discharge despite Terramycin (brand of oxytetracycline hydrochloride) therapy. Eight patients who were given placebo for six days had no demonstrable improvement; they recovered promptly after receiving Terramycin. At this hospital we have been impressed recently with the usefulness of nitrofurans as well as the tetracyclines. In a small series we have employed Furadantin (brand of nitrofurantoin) orally and Furacin (brand of nitrofurazone) as a urethral suppository with satisfactory response.

We believe that studies to evaluate various agents and to elucidate the natural history of the disease are in order. At this hospital we see few early cases, but we do eventually see almost all of the "refractory" cases in the Third Naval District from all three branches of the service. Inasmuch as new cases are generally seen first at base dispensaries and aboard ship we suggest that a study at that level would be most fruitful. Opportunity for follow up is also greatest at that level.

Our study of "refractory" cases has revealed misdiagnosis as the most common cause of therapeutic failure. The three most commonly misdiagnosed entities referred to us have been

1 Unrecognized urothral strictures These are usually congenital and are commonly at the meatus, and are easily observable but frequently not looked for. Congenital stricture at the level of the corona are common and strictures elsewhere secondary to previous infection, although fewer in number than in former years, are not rare. While the original diagnosis of nongonococcal urethritis may have been correct, cure, as with infections elsewhere, will not be accomplished until the obstruction has been relieved. For this reason all refractory cases should have the urethra calibrated and strictures discovered or ruled out.

2 Traumatic urethritis, resulting from "milking down" the urethra both to see and rid oneself of infection.

3 Venereal neuroses and guilt reactions without actual disease. The relationship of this entity to the second is evident.

Less commonly, misdiagnoses associated with the urethral discharge or other related symptomatology have been (1) urethral polyps, (2) trichomonas infections,\* (3) cancerophobia and other neuroses. Treatment for each of these entities is available and usually satisfactory.

Our opportunity for follow up is limited and statistical study is difficult because we treat a large number of men afloat and from outlying posts. We assume that a patient has been cured after therapy if he is not returned to us by a physician aboard the ship or at an outlying post who is at the same time referring to us patients with recently discovered prostatourethritis. We are certain a more careful study of so called refractory cases will reduce the incidence now estimated at 8 per cent to much lower levels.

### SUMMARY

Nonspecific prostatourethritis is a disease of unknown etiology. At present, it appears that it is infectious in origin and may be transmitted venereally, but no specific causative organism has been isolated.

Judging from the literature, the incidence is higher among the military than among the civilian population.

The therapy with which we have had the most success has included use of antimicrobial agents, prostatic massage when there is involvement of the prostate, and restriction of alcoholic beverages, condiments, and caffeine. In addition to the tetracyclines we have had satisfactory responses from using Furadantin (brand of nitrofurantoin) orally and Furacin (brand of nitrofurazone) as a urethral suppository.

The incidence of "refractoriness" will be greatly reduced if urethral strictures, traumatic urethritis, venereal neuroses, urethral polyps, trichomonas infections, and cancerophobia



and other neuroses are not misdiagnosed as being nonspecific prostatourethritis

## REFERENCES

- 1 Ambrose S. S. Jr and Taylor W. W. Study of etiology and therapy of nongonococcal urethritis *Am J Syph* 37 501-513 Nov 1953.
- 2 Nongonococcal urethritis in the Navy *Statist Army Med* 12 8-11 May 1956.
- 3 Groton W. M. Incidence of antibiotic-resistant phyllococci in nongonococcal urethritis *U S Armed Forces M J* 5 843-846 Jun 1954.
- 4 Shepard M. C. Recovery of pleuropneumonia-like organisms from Negro men with and without nongonococcal urethritis *Am J Syph* 38 113-124 Mar 1954.
- 5 Wagner B. M. Mors W. H. and Kahn D. M. Research studies on nonspecific urethritis *Am J Pub Health* 43 853-859 July 1953.
- 6 Day C. H. and Arm H. G. Clinical and bacteriologic studies on nongonococcal urethritis *J Urol* 74 202-206 Aug 1955.
- 7 Wolf F. S. Thoshinsky M. J. Chodosh S. Arrington J. D. Jr. Therapy of nongonococcal urethritis: comparison of oral and intramuscular tetracycline *U S Armed Forces M J* 7 852-864 June 1956.
- 8 Feo L. G. Ent T. R. Peoples D. M. and Morton H. E. Bacterias associated with trichomonas vaginalis in male urethritis *J Urol* 75 711-716 Apr 1956.

## ANTIBIOTICS MAY BE TOXIC

Sometimes let us admit the doctor is in a panic "to do something" for a patient who has a fever while the cause of the disease has not been determined. This often results in the institution of a completely irrational regimen of antibacterial therapy. All of us should remember that any antibacterial agent may be a poison for some patients and hence use thought and discrimination in the use of sulfonamides and antibiotics. If we do this the incidence of the harmful effects of antibiotics will be lessened and the treatment of the patient and his infectious disease will be greatly improved.

—PERRIN H. LONG M.D.  
in *Journal of Medical Society of New Jersey*  
PP 439-440 Oct 1954

# FRACTURES OF THE FEMORAL SHAFT

RICHARD M. CRONIN, *Captain, USAF (MC)*

DAVID SILVER *Captain USAF (MC)*

**T**HE increase in number of automobile accidents in the last decade, making fractures of the shaft of the femur more prevalent, and the possibility of mass casualties in this atomic age make it absolutely necessary that fractures of the femoral shaft be treated by the method which has the fewest complications and the best results. Reducing the period of disability is of particular importance to the military.

In an attempt to determine the ideal method of treatment, a study of femoral shaft fractures in regard to type of treatment, complications, and results was undertaken. The methods studied included intramedullary fixation, which has become rather widely accepted.<sup>1-3</sup> It must be utilized under the proper circumstances and has many pitfalls and complications, but some of these can be avoided.

## METHODS

One hundred and two patients with 106 fractures of the femoral shaft were either treated directly by us or were studied from case records. All of these patients were treated in United States Air Force Hospitals.

Our average follow up of patients treated by intramedullary nails was 1.7 years with a range from 2 weeks to 6 years. The average for those treated by skeletal traction suspension was 1.85 years with a range from 4 months to 5 years.

There were 95 males and 7 females. All patients were members of the armed services except two, who were female dependents. Their ages ranged from 16 to 70 years, averaging 23.4 years. Table 1 lists the causes, and table 2 the types and locations of the fractures.

These patients were treated by many different orthopedic surgeons, who used a variety of methods that have been described previously.<sup>4-7</sup> Forty seven of the patients had early intramedullary nailing and 17 had nailing plus autogenous iliac bone graft. There were 8 patients who had an open reduction with application

---

From U. S. Air Force Hospital, Chanute Air F.

of a metallic plate and screws Skeletal traction was used in 25 cases while manipulation and plaster immobilization in a hip spica cast was performed in 4 Russell skin traction was used in 1 case

TABLE 1 Causes of fractures

Cause	Fractures	
	Number	Per cent
Motor vehicle accident	90	84.9
Fall (ambulatory)	9	8.5
Plane crash	5	4.7
Fall from horse	2	1.9
Total	106	100

TABLE 2 Types and locations of fractures

TABLE 2 Types and locations of fractures					
Location	Types				Total
	Closed		Open		
	Comminuted	Transverse and oblique	Comminuted	Transverse and oblique	
Joint on upper and middle thirds	13	8	1	4	22
Middle third	34	17	6	1	61
Joint on middle and lower thirds	8	12	2	1	23
Total	55	37	9	5	106

RESULTS

two groups

## RESULTS

## Intramedullary Nailing

Open medullary fixation will result in at least two groups of complications (1) Those that are related to the nail itself and (2) those that may develop as a result of an open reduction. Among the 64 patients in this series who had intramedullary nail fixation 2 had broken nails. In 1 case a new nail had to be inserted. This patient stated that since removal of the distal half of the nail through his knee he has had pain. In the other patient only the proximal half of the nail could be removed.

Another complaint in 1 patient was the migration of the nail proximally, with resultant hip pain, until it was advanced by means of a second operation. The nail could not be removed in 1 instance but fortunately was not causing any difficulty.

Hip pain seemed to be a somewhat frequent complaint and was noted in 29 per cent of those with intramedullary nail fixation. It was usually caused by bursitis and inflammation in the region of the proximal tip of the extruding nail. Often the bursa would become calcified, leading to increased pain. The pain was noticed particularly after the patient had been sitting for varying periods of time.

In this series there were no complications as a result of the length or diameter of the nail, such as sometimes occurs.<sup>10</sup> There were no instances of the nail cutting out or splitting the femoral shaft. The problem of a nail being stuck at the isthmus of the femoral shaft was not encountered. Fat emboli and surgical shock were not encountered in this series. Two patients developed cardiac arrest, one responded to cardiac massage and the other died. Cardiac arrest took place before the incision was made in one of these patients. Two instances of osteomyelitis were recorded, one of which was in the shaft in a closed, comminuted fracture and the other at the site of an iliac bone graft. There were two cases of pulmonary embolism and one each of phlebotrombosis and thrombophlebitis. None of these four were fatal. One patient developed a nonunion because the intramedullary nail had migrated proximally. There were two cases of malunion. One occurred because the nail had bent, resulting in an anterior and lateral bowing of the shaft. In the other, an external rotation deformity below the fracture site required a later osteotomy.

Shortening was present in 19 per cent of those treated by intramedullary nailing. Eighteen per cent stated that they either had pain of some degree or some loss of motion in the knee.

#### Skeletal Traction

In the 25 patients treated with skeletal traction and suspension, there were 5 instances of malunion and 1 of nonunion. The pin tract in the tibia became infected in 1 patient with a resultant osteomyelitis. One patient developed a thrombophlebitis and another cystitis with calculus formation in the ureter. Forty-eight per cent claimed to have some difficulty with their knee, either pain or loss of motion, while 60 per cent had some degree of shortening. Table 3 compares the incidence of certain complications in patients treated with intramedullary nailing with that of patients treated with skeletal traction.

TABLE 3 *Comparison of incidence of complications in intramedullary nailing with the incidence in skeletal traction*

Complication	Method of treating fracture	
	Intramedullary nail (per cent)	Skeletal traction (per cent)
Bone		
Malunion	3.1	20
Nonunion	1.6	4
Refracture	1.6	8
Shortening	19	60
Osteomyelitis of tibial pin tract		4
Joint		
Pain or loss of motion in knee	18	49
hip	29	28
Prolonged bed rest		
Thrombophlebitis	3.1	
Pulmonary embolism	3.1	
Cystitis and ureteral calculus		4

#### Open Reduction and Fixation With Metallic Plate and Screws

Complications in the eight patients treated with this method included one instance each of osteomyelitis, a broken plate with refracture and delayed union. One patient had a tremendous blood loss following surgical procedure that required a transfusion of 5 000 ml. of blood.

#### Manipulation and Plaster Immobilization

Any analysis of this method might be misleading, for there were only four patients in the group. These four tended to have difficulty regaining knee motion, and three of them had some shortening.

#### Complications of the Fracture Itself

There were two supracondylar amputations in our series. Both of these were a result of direct vascular injury to the femoral artery. One was a closed comminuted middle third fracture, while the other was an open comminuted fracture at the junction of the middle and distal thirds. In one patient the artery was lacerated in the adductor canal while in the other it was lacerated in the popliteal area just after leaving the canal.

#### Return To Duty

In the military service a patient is not returned to duty until he is capable of performing his job. Thus, the hospitalization

is normally longer than in civilian life where the patient can convalesce at home before returning to work. We found that the average time for 102 patients before returning to full military duty, using all methods of treatment, was 4.7 months. The time for the patients with intramedullary nails was 3.2 months, with a range from 1 to 7 months. The average time for skeletal traction suspension method was 6.9 months, with a range of from 3 to 15 months. The number of patients treated with the other methods was too small to analyze, but none of them returned to duty as early as the group treated with intramedullary nails.

### COMMENTS

Fractures of the femur are very serious injuries, and the results of the treatment often leave much to be desired. Many of the complications that result from nailing can be overcome if proper conditions are satisfied. First, the fracture must be in the middle three fifths of the shaft. Secondly, the patient should be an adult in good general condition. Inasmuch as a fracture of the shaft of the femur requires a tremendous force, other associated injuries are often present. We found a rather high incidence of associated cerebral concussions. It is mandatory to wait until there are absolutely no contraindications to surgical intervention. Shock and blood loss should be vigorously treated before the patient is operated on. A patient with a femoral fracture treated by intramedullary nail fixation who suffers severe shock on the operating table obviously would have been better treated by skeletal traction. The nailing of open fractures should be postponed until the skin has healed and there is no evidence of infection. An osteomyelitis of the femur is a discouraging complication. There was only one case of osteomyelitis of the femur and one of the iliac crest in this series. It is absolutely necessary that the nailing be performed by a skilled bone surgeon. There should be adequate assistance, supervision, good instruments, and most favorable operating room facilities.

If the above conditions are fulfilled, intramedullary nailing of the fractured femoral shaft seems to be the best method of treatment. One of the most significant advantages is that less time elapses before return to duty. In our series, the patients treated with intramedullary nailing returned to duty almost four months sooner than those treated with the skeletal traction and suspension method.

Brav and Jeffress<sup>11,12</sup> thoroughly reviewed the healing time of these fractures and found it to average 16 weeks. Patients treated with the traction and suspension method did not heal any faster in our series. It is important to remember that the patient treated by nailing may be ambulatory while his fracture is healing.<sup>13-16</sup>

## SUMMARY

From a statistical study of 106 fractures of the femoral shaft it was found that patients returned to duty 3 7 months sooner with intramedullary nail fixation than with the skeletal traction suspension method Intramedullary fixation offered the best method of treatment of these fractures

## REFERENCES

- 1 Böhl r L *Medullary Nailing of Kuntscher* First English edition revised by the author Translated from the 11th German edition of Hans Treter Williams & Wilkins Co Baltimore MD 1948
- 2 Böhler L and Böhl r J Kuntscher a medullary nailing *J Bone & Joint Surg* 31 A 295-303 April 1949
- 3 Rush L V and Rush H L Technique for longitudinal pin fixation of certain fractures of ulna and of femur *J Bone & Joint Surg* 21 619-626 July 1939
- 4 Street D M Medullary nailing of femur comparative study of skeletal traction, dual pinning and medullary nailing *J A. M. A.* 143 709-714 June 24 1950
- 5 Street D M On hundred fractures of femur treated by means of diamond-shaped medullary nail *J Bone & Joint Surg* 33 A 659-669 678 July 1951
- 6 Van Gird r G W Fractures of shaft of femur critical end-result study of 105 consecutive cases at Massachusetts General Hospital *Surg Gynec & Obst.* 64 110-117 Jan. 1937
- 7 Wiant F M Use of skeletal traction in treatment of fractures of femur *J Bone & Joint Surg* 31 A 8 93 Jan. 1949
- 8 McKeever F M Fracture of shaft of femur in adult evaluation of methods of treatment *J A. M. A.* 128 1006-1012 Aug. 4, 1945
- 9 Coeur R Intramedullary pinning of diaphyseal fracture *J Bone & Joint Surg* 28 309-331 Apr 1946
- 10 Böhler J Results in medullary nailing of 95 fresh fractures of femur *J Bone & Joint Surg* 33-A 670-678 July 1951
- 11 Bray E A and Jiffre s V H. Fracture of femoral shaft clinical comparison of treatment by traction suspension and intramedullary nailing *Am. J Surg* 84 16-25 July 1952
- 12 Bray E A and Jiffre s V H. Modified intramedullary nailing in recent gunshot fractures of femoral shaft *J Bone & Joint Surg* 35-A 141-152 Jan. 1953
- 13 Fitt W T Jr Robert B Spont S I and Ritter V W Effect of intramedullary nailing on healing of fractures experimental study *Surg Gynec & Obst.* 89 609-615 Nov 1949
- 14 Gbormly R K Phaleo G S. Van Demark R E and Luck y C A. Fractures of femur result of treatment over period of 6 years at Mayo Clinic *Surgery* 15 887-893 June 1944
- 15 Greb A A. Fractures of shaft of femur *Am. J Surg* 80 161-169 Aug 1950
- 16 Kuntcher G Dr Marktag Jung von Knichenbruch u. *Arch f klin. Chir* 200 443-455 1940 also *Klin. Wochenschr* 19 833-835 Aug 17 1940

# ELECTROMYOGRAPHY

## Value in a Military Hospital

BENJAMIN L. CRUE Jr. *Lieutenant Commander MC USN*

THE CLINICAL value of electromyography, using a cathode ray oscilloscope with adequate shielding and with needle electrodes, has already been adequately documented<sup>1-3</sup> In recent years, this technic has been increasingly used in certain sections of this country by physicians, the majority of whom are specialists in the field of physical medicine During the year 1955-1956, the author carried out 186 electromyographic examinations at this hospital Inasmuch as the average time required for each examination was about 20 minutes, this represented over 60 hours spent in 1 year doing this one type of diagnostic test while at the same time running a busy neurosurgical ward This study was made to determine whether such an expenditure of time and effort was justified

### METHOD

Electromyographic examinations were performed, when indicated, both on outpatients in the neurosurgical clinic and on inpatients Some patients were referred from the neurologic and orthopedic services especially for this test Inasmuch as there was little teaching involved and little reason to believe that many of the cases would come to litigation, photographic tracings and magnetic tape recordings were seldom made Instead, the results were reported directly

### RESULTS

Of the 186 electromyograms performed,\* 125 (67 per cent) were positive and only 61 (33 per cent) were negative Of these 125 positive electromyograms, 66 were caused by lumbar "discs," 7 by cervical disks, 29 by peripheral nerve injuries, and 23 by such interesting diseases as Friedreich's ataxia (Roussy-Lévy syndrome), syringomyelia, myasthenia, cord tumor (neurofibroma),

---

Presented at the meeting of the American Association of Electromyography and Electrodiagnosis Atlantic City N J 9 September 1956

From U S Naval Hospital Chelsea Mass

These examinations were made with the Meditron electromyograph model 201A (fig 1)



progressive spinal muscular atrophy (including amyotrophic lateral sclerosis), multiple sclerosis myotonia poliomyelitis, and several cases of lower motor neuron neuritis of unknown cause (Guillain Barre syndrome)

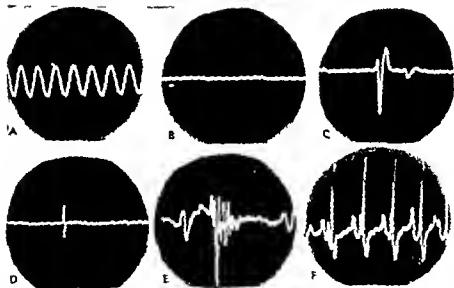


Figure 1 The Meditron electromyograph and sample tracings (A) Calibration, 60-cycle voltage 200 microvolts per inch sensitivity (B) Electromyographic silence of normal muscle (C) Normal motor unit voltage voluntary (D) Denervation fibrillation voltage involuntary (E) Complex (polyphasic) motor unit voluntary (F) Myotonia. (Pictures and captions adapted from Meditron chart)

An effort was made to compare the diagnostic accuracy of electromyography to myelography in the lumbar disk syndrome. In a previous series of 136 consecutive cases of proven L4-L5

and L5 S1 disks, the myelogram was found to be slightly superior in detecting a L4 L5 disk, while the electromyogram was more accurate with a L5 S1 disk. Only one error in preoperative localization was made—an accuracy of 99.4 per cent<sup>4</sup> (Electromyograms performed by Dr. James Golseth).

In the present series there were 31 patients on whom both electromyograms and myelograms were done and who were proved by laminectomy to have herniated disks (table 1). In these 31 cases where the accuracy of localization could be compared, the myelogram was the most accurate (81 per cent), the electromyogram next (74 per cent), and clinical localization last (68 per cent). The clinical localization of the herniated disk was based on motor (S1 root, decreased ankle jerk, L5 root, weakness of dorsiflexion of foot) and sensory signs (S1 root, lateral foot, L5 root, dorsum of foot). Clinical signs are thus root signs and subject to the same error of interpretation of level as the electromyogram. Thus, a midline L4 L5 disk affecting the S1 root would be interpreted as an L5 S1 disk both clinically and by the electromyogram. Every leniency was allowed in considering a myelogram as being indicative of a herniated disk. Several of the positive myelograms were small asymmetries "consistent with but not diagnostic of a herniated disk."

TABLE 1 Comparison between accuracy of clinical judgment, electromyogram, and myelogram in locating herniated "disks" in 31 patients

Location of "disk" at operation	Number of patients	Results			
		All three methods correct	Erroneous results*		
			Clinically	Electromyogram	Myelogram
L3 L4	1	1	0	0	0
L4 L5	9	4	2	3	3
L5 S1	19	9	5	3	2
L4 L5 + L5 S1	2	0	2	1	0
Total	31	14	9	7	5

\*In only 3 patients was more than one test either negative or in error.

It should be noted that although a definite indication of a defect on myelography, if it fitted the clinical picture, usually resulted in laminectomy, there were a number of patients with a less severe clinical syndrome who had minimal electromyographic findings of root compression, and did not have a laminectomy.

There were 21 errors out of 93 possible chances (3 tests on each of the 31 patients) In only 2 patients was there an error in preoperative localization of the lesion when all three factors were evaluated One was the previously mentioned midline L4 L5 disk giving both the clinical and electromyogram picture of an S1 root lesion This was interpreted as a probable L5 S1 disk, and myelography failed to disclose the error, as there was a congenitally anomalous dural sac ending at the L5 level The second case in error was a patient who had had two previous laminectomies Clinically only an unstable back was diagnosed, and the electromyogram was negative Myelography was compatible only with postoperative scarring, but on routine exploration before a spinal fusion a recurrent L4 L5 extrusion was found

### Peripheral Nerve Injuries

Even in peacetime a military hospital still receives a large number of patients with peripheral nerve injuries of a wide variety Included in this series were ulnar nerve lesions from elbow trauma and from lacerations of the wrist radial nerve lesions from Saturday night paralysis and from fractures of the humerus median nerve injuries incurred in automobile accidents and several brachial plexus injuries caused by severe trauma There were several cases of partial paraplegia following fracture of the spine at the caudal level where electromyography helped in ascertaining the root injury level One boy had fractures of all the transverse processes in the lumbar area on one side He had no abnormality of the lower motor neuron of the anterior primary division but apparently there was almost complete denervation of the posterior primary divisions in the lumbar area There were sciatic nerve injuries and several peroneal injuries producing foot drop some of which were difficult to distinguish from lumbar disk injuries or poliomyelitis The value of electromyography in following the regeneration of peripheral nerve injuries is well known and will not be discussed in detail here There were two cases however where the diagnosis of a nerve injury in continuity could be made and unnecessary operations prevented even though there was no grossly visible movement because the electromyogram showed the presence of functioning voluntary motor units Both patients recovered on conservative management

### CASE REPORTS

There were several unusual cases that show the value of electromyography

**Case 1** A 41 year old sailor had been admitted complaining of weakness of dorsiflexion of the left foot and minimal back pain The dif



cytes. An electromyogram showed no abnormalities but it was my impression that this probably was a case of poliomyelitis. The patient was admitted to the hospital and placed on bed rest. During the third week after the onset of weakness he developed definite denervation fibrillation in the already recovering right lower extremity. He made a prompt clinical recovery and returned to his class at the Academy.

Cases 3 and 4. Two patients were suspected clinically of having a herniated nucleus pulposus in the lumbar region and were referred for possible myelography. The electromyogram showed widespread lower motor neuron disease. Both patients subsequently were shown to have an infectious neuritis.

Case 5. Another unusual case was encountered when a young sailor was referred with the diagnosis of a left sixth cranial nerve lesion. He was scheduled for a "squint" operation on his left external rectus muscle. The ophthalmologist demonstrated that he could not follow laterally beyond the midline with his left eye. An electromyogram of his left lateral rectus was entirely negative, showing no denervation fibrillation when the muscle was inhibited by having him look to the right. This was a disappointment to the examiner as well as the ophthalmologist. It was interpreted as a failure of technique. Only later was it discovered that the patient must have had a very unusual unilateral supranuclear lesion. While he could not follow objects laterally with his left eye, he could externally rotate his left orbit to command.

Case 6. There is still much to be learned about the clinical use of this diagnostic tool in various pathologic conditions. Multiple sclerosis is usually considered a disease affecting primarily the white matter of the central nervous system. However, the nerve roots may show pathologic change. Electromyography on several patients with multiple sclerosis who had weakness in the lower extremities revealed only uncontrollable bursts of voluntary motor units characteristic of upper motor neuron disease but no evidence of lower motor neuron disease. However, in a recent case which has now progressed so that we are relatively certain of the clinical diagnosis of multiple sclerosis, the patient had in her lower extremities widespread complex motor units of a very marked degree without any real denervation fibrillation of fasciculation. This is possibly an example of the concept of demyelination without Wallerian degeneration. Whether one can interpret this type of finding in a demyelinating disease such as multiple sclerosis remains to be proved.

## DISCUSSION

### Technic of Examination

The electromyographic examination should be carried out by a physician who is familiar with the technic, who has some knowledge of the neuroanatomy and the suspected neurologic syn-

June 1957)

drome involved, and who has at hand at least a brief history of the individual patient's problem

It is not believed that a technician or medical corpsman could be trained to do this type of examination adequately by himself, although under proper supervision such trained personnel would be of great assistance

Performing electromyography on one's own patients has at least three advantages. First, there is the ability to choose which patients should be so examined. Second, there is an excellent opportunity in many cases to obtain prompt follow up correlations. For example, an electromyogram and a myelogram are often done one day, and a laminectomy is performed the following morning. Third, the examiner knows exactly what is wanted and can shorten the procedure, yet include pertinent parts of the examination. For example, if I know from taking a history and doing a physical examination, that a patient has low back pain with definite sciatic radiation and weakness of dorsiflexion of the great toe, all I want to know from the electromyogram is whether there is any denervation fibrillation in the distribution of the L5 nerve root as compared to the area supplied by the L4 and S1 roots. Consequently, only three muscles are tested: the quadriceps (L2-3-4), the anterior tibial (L4-L5), and the gastrocnemius (S1-2). The hamstrings, the gluteus, or the posterior primary divisions would not be tested.

The report in the record is mainly for my own evaluation and I usually need not worry whether another physician can interpret the recorded findings. While this type of examination destroys the strictly scientific objectivity of the test, the time saved is considerable and permits an over all average of about 20 minutes per examination. It further saves the patient needless needle punctures and allows a more thorough search to be made in the area of a clinically suspected abnormality. Of course, this abbreviated type of examination can only be used in certain selected cases.

#### Military vs Civilian Use

One difference between neurosurgical practice in a military hospital as compared to a large civilian neurosurgical center is the relatively larger preponderance of low back disorders and cases of peripheral nerve injury found in the service, even in peacetime. This should be reflected in a larger percentage of military neurosurgical patients who would be candidates for an electromyographic examination. In this series, however, electromyograms frequently were not done on patients with obvious peripheral nerve lesions, nor were they done on all patients with back disorders. This was only because of lack of time and be-

cause no other physician trained in electromyography was available

An example of the difference in the type of patients examined is shown in the percentage of positive electromyograms. Of the 186 electromyograms performed 125 (67 per cent) were positive and only 61 (33 per cent) were negative. In a civilian electrodiagnostic clinic, where patients are referred for various reasons by many different doctors, negative examinations are in the majority. Such a large percentage of positive electromyograms did not result from my eagerness to find denervation fibrillation. It was produced by selectively choosing the patients on whom electromyography was done.

Although there may be a significant number of false negatives in electromyography, one of the advantages of the test is that there should be no false positives although there may be incorrect interpretation of the findings. In all suspected root compression syndromes a positive record is not reported unless denervation fibrillation (fig 1) is definitely present. The large majority of patients who are examined for low back disorders are from the neurosurgical service. A certain number of these patients however are referred from the neurologic, orthopedic and even from the psychiatric services, where a negative electromyogram is expected but is desired as part of the clinical study.

One of the main values of electromyography is in the detection of early minimal root compression. This is not as true in military medicine as in civilian practice where disability litigation may be involved. Although the military patient either has to be fit for duty or remain hospitalized until disposition is made, negative evidence as for an industrial compensation board need not be gathered.

Each patient with a low back disorder was judged clinically as to whether or not he had herniated disk. Patients with mechanical disorders of the back were transferred to the orthopedic service. A patient was referred for either electromyography or myelography only if he was suspected of having a "disk" and was having enough pain so that if the electromyogram and the myelogram were positive laminectomy would follow. There was not time to do electromyograms on those patients who had minimal complaints and who would not have been advised to have an operation even if the electromyogram did lend further substantiation to the clinical diagnosis of minimal root compression. These patients were all treated conservatively and a large majority of them returned to duty without having either an electromyogram

or a myelogram. In a number of cases in which the diagnosis was questionable, an electromyogram was done even though the complaints might have been minimal. These patients made up a large share of the negative reports.

#### Comparison of Electromyogram With Myelogram

In the comparison of electromyogram to myelogram, the relative value is not shown in its true aspect. The 7 electromyographic errors included 2 where the test was done before the necessary 3 weeks had elapsed since root compression. This error was kept to a minimum by usually not doing electromyograms on patients without a history of at least 21 days of sciatic pain. One other case was an error in localization where an L4 L5 midline disk affecting the S1 root had been interpreted as an L5 S1 disk. The other 4 errors were in missed diagnoses, that is, the electromyogram was negative although a definite herniation was found at operation. The nerve roots unfortunately were not stimulated to see whether there had been damage to the conductivity of the motor efferent fibers. It is thought that it is possible to have a disk protrusion doing enough damage to the roots to cause considerable pain (and give a large myelographic defect) without much motor damage, resulting in a normal electromyogram. However, in 2 of the 4 cases with normal electromyograms there had been nerve root damage of long standing with considerable atrophy, weakness, and reflex change. A normal electromyogram in this situation is not completely understandable unless the author's method of trying to sample 40 different areas in one muscle tested is not statistically adequate. Basically, however, electromyography is of comparable accuracy to myelography for diagnosing herniated lumbar disks. It is certainly an easier preliminary screening test and there was at least 1 case in the 31 where the patient would not have had a myelogram or an operation had the electromyogram not been found to be positive. It was believed that the patient had a functional, stocking anesthetic, but after repeated returns to the clinic an electromyogram was done in desperation and to our surprise showed considerable fibrillation in the distribution of the S1 root. I feel certain that in this case much additional time would have elapsed before any neurosurgeon would have contemplated performing a myelogram on the patient, in view of her particular history and complaints.

#### SUMMARY AND CONCLUSIONS

During the year 1955-1956, 186 electromyographic examinations were carried out on the neurosurgical service of this hospital. Of these, 125 (67 per cent) were positive.



In a series of 31 consecutive cases of herniated lumbar "disk" proved by laminectomy the electromyogram was correct in 74 per cent of the cases the myelogram in 81 per cent. By combining the results only 2 errors in preoperative diagnosis of location were made.

Several unusual cases in which the electromyogram was of especial help or interest are presented briefly.

The advantages of electromyographic examination of patients with whom the examiner is familiar is stressed.

It is concluded that electromyography is of definite value in a military hospital. Although the cases described in this report emphasize particularly the value of electromyography in the diagnosis of herniated intervertebral disks it also is useful in peripheral nerve injuries and other neurologic and neurosurgical conditions.

#### REFERENCES

- 1 Golseth J G Diseases of central nervous system symposium diagnostic contributions of the electromyogram. *California Med.* 73: 335-357 Oct 1950
- 2 Woods W W and Shea P A Value of electromyography in neurology and neurosurgery. *J Neurosurg* 8: 595-600 Nov 1951
- 3 Marinacci A A *Clinical Electromyography* San Lucas Press Los Angeles Calif 1955
- 4 Crue B L Pudez R H Shiden C H and Frebwater D B Observations on value of clinical electromyography To be published in *J Bone & Joint Surg*
- 5 Light S H (editor) *Some Clinical Applications of Electrophysiology Especially Electrodiagnosis and Electromyography* (Physic Medical Library Volume 1) E. Light 360 Fountain St New Haven Conn 1956
- 6 Marinacci A A and Raad C W Electromyogram diagnosis of infectious with particular reference to differential diagnosis between this disease and neurologic lesions. *Bull Los Angeles Neurol Soc* 21: 37-48 March 1956

# NONSPECIFIC EPIDIDYMITIS IN THE MILITARY SERVICE

WILLIAM M. ROSS *Major MC USAR*  
JAMES H. MAYNARD *Captain MC USAR*

**N**ONTUBERCULAR, nongonococcal epididymitis is far more common than textbooks would lead one to believe, and the incidence in military personnel is particularly high. Military surgeons have often observed this condition in men who are otherwise entirely well but have been forced to march or parade for long periods of time, or have been subjected to marked exertion, but who have had no instrumentation or operation. These cases occur frequently enough to account for a significant number of hospital admissions to the urologic service of the average Army hospital, and result in many duty hours lost. In 1956, Gartman<sup>1</sup> reported that of 189 patients with epididymitis, there were 76 acute and 14 chronic cases of which the cause was not known, although retrograde flow of urine was considered.

Numerous cases of nonspecific epididymitis have also been reported in industry. Amdur,<sup>2</sup> in 1943, described 14 industrial cases, most of which occurred after muscular exertion. Many of the patients admitted a full bladder at the time of strain. These cases were characterized by an absence of constitutional symptoms, urinary symptoms, or urethral discharge. Urine examination was essentially negative in all of the patients. It was suggested that the clinical picture could be explained as an irritant response to the retrograde propulsion of urine down the vas deferens.

Anatomically, this theory seems entirely plausible. The prostatic urethra is the widest portion of the urethra, its proximal end being closed by the internal sphincter and its distal end by the membranous urethra, which is the narrowest and most rigid portion of the canal. At the time of strain, urine may pass through the internal sphincter and be blocked at the external sphincter, some of the urine being forced into the ejaculatory duct and down the vas deferens. This would be most likely to happen with a full bladder.

It has been shown experimentally that urine can be made to travel in this retrograde manner.<sup>3-5</sup> Graves and Engal<sup>4</sup> injected

---

From U S Army Hospital Fort Leonard Wood Mo. Dr. Ross is now at 8201 South Ashland Ave. Chicago 20 Ill.

fluid down the vas deferens in dogs, using sterile urine obtained from the animal on one side and saline on the other side for control. The saline injection did no harm but inflammation of the epididymis developed on the side injected with urine. These investigators proposed the concept that sterile urine can find its way into the vas deferens and cause a chemical epididymitis.

Our study was undertaken to better understand the nature of acute idiopathic epididymitis particularly as it applies to the military. Ninety-two cases of epididymitis of which 90 were nonspecific, were observed over a 15 month period at this hospital. A large number of this group of patients were trainees. The age range was 17 to 37 most of the patients being from 19 to 22 years of age. In each case a careful history was taken and a complete physical examination made. The following laboratory procedures were performed in each case: total and differential leukocyte counts, complete urinalysis, urine culture and examination of a smear of the prostatic secretion.

These patients were first seen from 12 hours to 5 days after the onset of symptoms, the majority being seen within 24 to 48 hours. The onset in 32 patients was described as sudden, with severe scrotal and inguinal pain, followed in a few hours by scrotal swelling. In the remaining 60 patients the onset was slow with symptoms reaching their height in 24 to 48 hours. Of the total number of patients, 16 (less than 20 per cent) complained of constitutional symptoms such as malaise, headache or loss of appetite. The others did not feel nor appear ill. Twenty-one of the patients showed a temperature elevation over 99.5 F, 8 of these having a temperature of over 100 F. The highest temperature was 102 F.

Symptoms of epididymitis (table 1) appeared after physical training in 12 patients, after heavy lifting in 16, after long marches in 13, and after a long automobile ride in 2. Twenty-one of the patients reported that they felt an urgent need to urinate at the time of exertion or marching.

TABLE 1 Symptoms of 92 patients with epididymitis

Symptom	Number of patients
Scrotal pain	92
Scrotal swelling	92
Urinary symptoms	18
Urethral discharge	2
Fever	21
Malaise	2

Of the 92 cases studied, 5 were recurrent. Seven patients gave a positive history of gonorrhea, each apparently having been cured with antibiotics. A minimum of four months had elapsed from the time of gonorrheal infection until the attack of epididymitis occurred. Urinary symptoms such as frequency, burning, and dysuria were reported by 18 patients. No patient gave a history of hematuria. One patient had a slight urethral discharge at the time symptoms of epididymitis developed, which was negative for gonorrhea. Another patient had a discharge that was positive for gonorrhea two days prior to the onset of the symptoms of epididymitis.

Of the 92 cases of epididymitis, 52 were on the left side, 39 were on the right, and 1 was bilateral. Examination revealed a moderate to marked enlargement of the whole epididymis in 88 patients, the lower pole alone being enlarged in 4. The epididymis was very hard and tender in all cases. The prostate was considered to be abnormal in 10 patients—enlarged and boggy in 4 of these, indurated and irregular in 5, and definitely enlarged, hard, and markedly irregular in 1, this last case being proved to be caused by tuberculosis.

The white blood cell count was elevated in 24 cases. Of these, the highest count was 20,000 per  $\mu$ l, most patients in this group having counts between 12,000 and 14,000 per  $\mu$ l. The count in the remaining 68 patients was under 10,000 per  $\mu$ l. Urinalysis was reported as negative in all but 26 cases, and most of the positive urines contained only a few pus cells. Prostatic secretions of 11 patients were considered abnormal, with a marked increase in the number of white cells in 2 cases. Urine culture was positive in 13 patients—*Escherichia coli* in 11, *Micrococcus pyogenes* var. *albus* in 1, and *Mycobacterium tuberculosis* in 1.

#### TREATMENT AND RESULTS

All patients were treated with a firm scrotal support, ice bag, and bed rest, followed in a few days by gradually increased activity with a support. In the late stages, heat in the form of Sitz baths was employed. It has been our impression that the use of cold in the early stages, rather than heat, is more effective in making the patient comfortable and in bringing about rapid resolution. Sixty of the 92 patients were given penicillin, aureomycin, terramycin, or streptomycin, alone or in combination. The remaining 32 patients received no antibiotics.

Most of the patients were quite comfortable after the first 24 hours of hospitalization, and only a few required more than aspirin for the relief of pain. The length of hospital stay varied from 5 to 45 days, the majority returning to duty in 14 to 18 days (table 2). Antibiotics were of value in treating the patients with urinary infection, abnormal prostatic secretion, or constitutional symptoms. The course of events in t

TABLE 2 Length of hospital stay of 92 patients with epididymitis

Days	Patients (per cent)
5 11	14
12 16	41
17 25	29
26 35	12
36 45	4

influenced little or not at all by antibiotic. Of the 92 patients treated, 6 had recurrences. In one patient the inflammation persisted in spite of antibiotics, showed definite evidence of suppuration and necessitated eventual orchiectomy. Orchiectomy was also performed on the one patient with tuberculous epididymitis. The disease became chronic in four patients and was treated by epididymectomy. There was no evidence of suppuration in the majority of patients. The patients were followed for periods of from 1 to 6 months after release from the hospital. Follow up examination revealed the presence of a small residual nodule in the lower pole of the epididymis in 86 patients. In the other 26 patients resolution appeared to be complete. Atrophy of the testis was not observed.

#### CONCLUSIONS AND SUMMARY

The occurrence of acute epididymitis is a relatively common occurrence among young military personnel, the vast majority of these cases being classified as nonspecific. In the present series of 92 cases, only 2 were found to be specific (1 caused by tuberculosis and 1 by gonorrhea). Of the nonspecific cases most appeared to be abacterial as evidenced by the laboratory findings and the lack of constitutional and urinary symptoms. Suppuration also was notably lacking. Those findings though not conclusive, lend support to the mechanicochemical theory in the production of the majority of these cases. In those cases that we have classified as abacterial the use of antibiotics appeared to be of questionable value.

Strain and exertion often play a part in the production of epididymitis, and this is especially likely to happen when the bladder is full. Emptying the bladder prior to strenuous exercise or long marches may possibly be of value in decreasing the incidence of acute epididymitis.

In only an occasional patient with nonspecific epididymitis was surgical intervention necessary. Operative treatment is advisable in chronic symptomatic epididymitis and in stubborn recurrences. Epididymectomy is preferred over orchiectomy as the operative procedure.

## NONSPECIFIC EPIDIDYMITIS

845

## REFERENCES

- 1 Gartman E Causes of epididymitis U S Armed Forces M J 7 531 539 Apr 1956
  - 2 Amdur M L Industrial epididymitis and epididymo-orchitis Indust Med 12 371 373 June 1943
  - 3 Rolnick H C Mechanism of epididymitis Surg Gynec & Obst 41 15 20 July 1925
  - 4 O'Connor V J Silver solution in lumen of vas after bladder instillation. J Urol 33 422 425 Apr 1935
  - 5 Kreutzmann, H. A. R Symposium on pyogenic prostatitis studies of injection of vas deferens J Urol 39 123 127 Feb 1938
  - 6 Graves R S and Engel W J Experimental production of epididymitis with sterile urine clinical implications J Urol 64 601 613 Oct 1950
- 

## SERVICEMEN AND MOTOR VEHICLES

Service personnel have one of the worst accident records of any group in the nation. Automobiles driven by young servicemen are "an undesirable insurance risk." Military personnel are involved in about one out of every 30 fatal accidents in the United States! Yet servicemen and women don't add up to nearly 1/30 of the total population—nor do they drive even one out of each 30 miles driven in the nation.

While motor vehicle accidents are the major cause of off duty deaths and injuries in the armed forces, other types of accidents also account for a considerable number of off duty casualties each year. Off duty accidents are the most important accident problem facing the armed forces. Strangely enough, these mishaps befall the same men and women who—day after day—cope successfully with far greater risks while on their jobs.

The terrific cost of injuries and fatalities in armed forces personnel cannot be measured accurately in dollars and cents. Merely taking the \$10,000 Government life insurance policy which was paid to the beneficiaries of the 3,657 accidental deaths in the armed forces during 1953 contributed the sum of \$36,570,000 to the total cost of these accidents.

—THEODORE C. BEDWELL, Jr., Col USAF (MC)  
in *Military Medicine* p 436 June 1955

# COURSE ON EMERGENCY MANAGEMENT OF THE NATIONAL ECONOMY

The Industrial College of the Armed Forces operates under the direct supervision of the Joint Chiefs of Staff and is charged with bringing the problems and methods entailed in maintaining national economic readiness to the attention of Regular, Reserve and National Guard officers and civilians and Government personnel who may hold positions of importance to the national economy in an emergency. The College conducts resident and extension courses, and a series of National Resources Conferences.

**Extension Course.** A correspondence course on Emergency Management of the National Economy is designed to educate civilian and military key personnel who cannot attend the Resident Course, in regard to the all important civilian military relationship upon which the Nation depends in this era of constant readiness. The two are inseparable and there must be the highest degree of co-operation and understanding.

Immediate benefits accrue to enrollees. The graduates of this unique course are better informed and therefore more capable of understanding the significance of national and international happenings. The textbooks and examinations explain the interdependence and relationship of the many subject areas that have an important bearing on economic readiness.

A certification of completion is awarded by the Industrial College of the Armed Forces to every student who successfully completes the course, and the military services have authorized the award of 48 credit points for retention, promotion and retirement to Reservists not on active duty. All graduates may retain the textbooks which are available through no other source and constitute a valuable addition to the personal library of anyone concerned with the future of the military, the Nation's economy and the world situation as it affects our plans and policies.

Those who wish to enroll in the extension course may communicate directly with the Correspondence Study Branch, Industrial College of the Armed Forces, Washington 25, D. C. A prospectus will be forwarded which outlines the eligibility requirements and includes an application form and necessary instructions.

Patients who have an early rupture of the membranes or a firm, long, and undilated cervix will benefit most from early cesarean section.<sup>11</sup> This is the preferred method of treatment in patients with transverse presentation associated with a live baby unless the cervix is at full dilatation, and one can accomplish internal version easily.<sup>1</sup> Requirements for internal version and extraction include a sound uterus, complete cervical dilatation, no disproportion, and a sufficient quantity of amniotic fluid.<sup>1</sup> Following vaginal delivery, the uterine walls should be manually explored to rule out the possibility of a ruptured uterus.<sup>1</sup> The use of antibiotics, oxygen, and blood, when indicated, are helpful adjuvants to the management of the mother and child.

**Complications.** In more recent times, maternal deaths from transverse presentation have been uncommon but the morbidity continues to be high. Puerperal infection and hemorrhage have been the leading factors. The major causes of hemorrhage in this condition are placenta previa, abruptio placenta, uterine rupture, and cervical lacerations. Internal version and extraction is not a benign procedure. In 1945, Morrison and Douglass<sup>12</sup> noted that internal version and extraction was second only to previous cesarean section as a cause of ruptured uterus. The fetal mortality is particularly high in vaginal delivery and increases in direct proportion to the duration of labor.<sup>1</sup> Causative factors in fetal mortality include prolapsed cord, anoxia due to uterine tetany, and birth trauma.<sup>1</sup>

#### EXPERIENCE AT THIS HOSPITAL

During 1954 and 1955, there have been 5 cases of transverse presentation among 2,116 deliveries at this hospital, an incidence of 1 in 423 deliveries. Although we realize that no conclusions can be drawn from this small series, we are reporting our findings. The patients were all in labor at the time of diagnosis, after gestation periods of 29, 30, 36, 36, and 40 weeks, respectively. Possible causative factors for the transverse presentation included a low implantation of the placenta and multiparity associated with a relaxed abdomen in one patient, and a moderate degree of hydramnios in two patients. The causes in the other two patients were unknown. Four of the patients were delivered by cesarean section and one by internal version and extraction. The latter was in her 29th week of gestation. The four babies delivered by cesarean section are living, the one delivered by internal version and extraction died at one month of age from complications associated with prematurity.

#### SUMMARY

Although the incidence of transverse presentation of the fetus is relatively low, the associated fetal mortality and maternal morbidity are still impressively high.



a greater degree of fetal mobility Other important causative factors include hydramnios, fetal death in utero, ventral hernia, pelvic tumors, full bladder or rectum, bicornate uterus, pre mature labor and a contracted pelvis

**Diagnosis** Inspection of the abdomen alone is often enough to arouse suspicion that a transverse presentation exists because the fundus of the uterus lies at a lower plane than usual and the abdominal enlargement is transverse to the mother's longitudinal axis The head and breech can be ballotted in the iliac fossae Examination rectally or vaginally may reveal the absence of fetal parts, or there may be a prolapsed extremity, shoulder cord, or thorax presenting Roentgenography confirms the position of the fetal skeleton, and soft tissue technics and cystograms aid in locating the placenta All patients who are suspected of having a footling breech and those in whom the diagnosis of a breech is uncertain, should have vaginal and roentgenographic examinations to rule out transverse presentation

**Treatment** Transverso presentation is a diagnosis which should be made during one of the prenatal visits After the diagnosis has been made, an attempt should be made to find the causative factor and locate the placenta, through the use of physical and roentgenographic examinations External version should be attempted when the condition is diagnosed, unless placenta previa uterine bleeding a dead fetus, or hydramnios are present, or when elective cesarean section is planned for some other reason, or when labor has progressed too far at the time of diagnosis

The dangers of doing external version are minimal if certain precautions are followed In order to prevent the placenta from being damaged the part of the uterus that houses the placenta should not be handled The patient should be prepared by having her bladder emptied Pillows should be placed under her head shoulders and knees in order to encourage good relaxation of her abdomen Talcum powder may be applied to the flat of one's hand steady gentle manual pressure is applied to the fetal pole After version is accomplished the fetal heart tones should again be auscultated and if they are abnormal the procedure for version must be reversed The patient should be checked weekly after the 32d week and external version repeated, if necessary External version may be attempted even when the diagnosis is made in early labor Spontaneous version to the cephalic presentation occurs in about 27 per cent of the cases

# ARTIFICIAL RESPIRATION TECHNIC FOR INFANTS AND SMALL CHILDREN

*At the request of the American National Red Cross, the National Academy of Sciences—National Research Council convened an Ad Hoc Panel on Manual Methods of Artificial Respiration on 8 March 1957 to advise as to the best method presently available for administering artificial respiration to infants and small children. The panel, comprising many eminent authorities on the subject, unanimously recommended the technic herein described*

—Editor

## TECHNIC FOR ADMINISTRATION

### *Step 1*

Clear the mouth of any foreign matter with the middle finger of one hand. With the same finger hold the tongue forward (fig. 1)

### *Step 2*

Now place the child in a face down, head down position and pat him firmly on the back with the free hand. This should help dislodge any foreign object in the air passage (fig. 2)

### *Step 3*

Place the child on his back and use the middle fingers of both hands to lift the lower jaw from beneath and behind so that it "juts out" (fig. 3)

### *Step 4*

Hold the jaw in the position described in Step 3, using one hand only (fig. 4)

### *Step 5*

Place your mouth over the child's mouth and nose, making a relatively leakproof seal, and breathe into the child with a smooth steady action until you observe the chest to rise. As you start this action, move your free hand to the child's abdomen, between the navel and the ribs, and apply continuous moderate pressure to prevent the stomach from becoming filled with air (fig. 5)

### *Step 6*

When the lungs have been inflated, remove your lips from the child's mouth and nose and allow the lungs to empty. Repeat this cycle, keeping one hand beneath the jaw and the other hand pressing on the stomach at all times. Continue at a rate of about

The factors operative in producing transverse position of the fetus include polar implantation of the placenta multiparity hydramnios, fetal death in utero, ventral hernia pelvic tumors full bladder or rectum, bicornate uterus, premature labor, and a contracted maternal pelvis

Abdominal or rectal examination usually discloses the transverse position Roentgenography will confirm the position of the fetal skeleton and the placenta may be located by using soft tissue technic

Transverse presentation is treated by either cesarean section or version External version may be attempted unless placenta previa, uterine bleeding a dead fetus or hydramnios are present or labor has progressed too far at the time diagnosis is made Cesarean section is the preferred method of treatment in patients with a live fetus who are in labor, unless the cervix is fully or almost fully dilated at the time of diagnosis, or internal version may be easily accomplished

During the two years 1954 and 1955 five patients with transverse presentation have been treated at this hospital Four of these were delivered by cesarean section and the infants survived One was delivered by internal version after 29 weeks of gestation the infant dying one month later from complications of prematurity

#### REFERENCES

- 1 Gare L C and Ritzschlet J C Transverse presentation experience with transverse presentation at Baltimore City Hospital and University Hospital over period of 10 years *Am J Obst. & Gynec* 63 583-591 Mar 1952
- 2 Sinsky J E Transverse presentation *Wisconsin M J* 52 184-186 Mar 1953
- 3 De Lee J B Use of solution of posterior pituitary in modern obstetric *J A. M. A.* 115 1320-1324 Oct 19 1940
- 4 Eastman N J (ed) *Williams Obstetrics* 10th edition Appleton Century Crofts Inc New York N Y 1950 pp 812-819
- 5 Johnson C M Transverse presentation of fetus analysis of 186 consecutive cases *Am J Obst. & Gynec* 57 765-769 Apr 1949
- 6 Stevenson C S Transverse or oblique presentation of fetus in last 10 weeks of pregnancy its causes general nature and treatment *Am J Obst. & Gynec* 58 432-446 Sept 1949
- 7 Gopferud J and Eastman N J Compound presentation survey of 65 cases *Obst & Gynec* 1 59-66 Jan 1956
- 8 Mangione E and Kau W M Persistent transverse presentation of fetus *Am J Obst & Gynec* 69 742-747 Apr 1955
- 9 Obstetrical case report *Bull School Med. Univ Maryland* 38 107 Apr 1953
- 10 Stevenson C S Certain concepts in handling of breech and transverse presentations in late pregnancy *Am J Obst & Gynec* 62 488-505 Sept 1951
- 11 Garbner E C Jr and Ware H H Jr Transverse presentation of fetus *Am J Obst & Gynec* 61 62-70 Jan 1951
- 12 Morris J H and Douglas L H Rupture of uterus *Am J Obst & Gynec* 50 330-335 Sept 1945

# ARTIFICIAL RESPIRATION

Fig 3

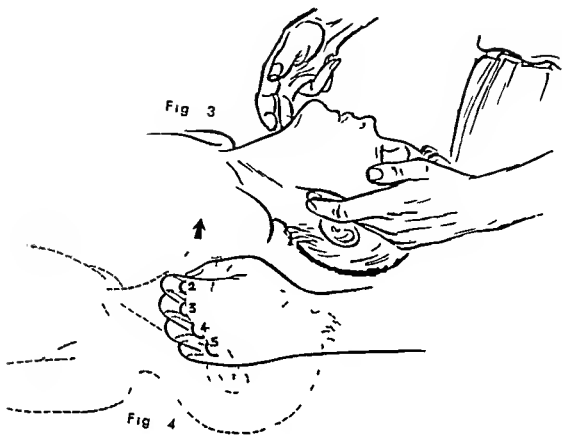


Fig 4

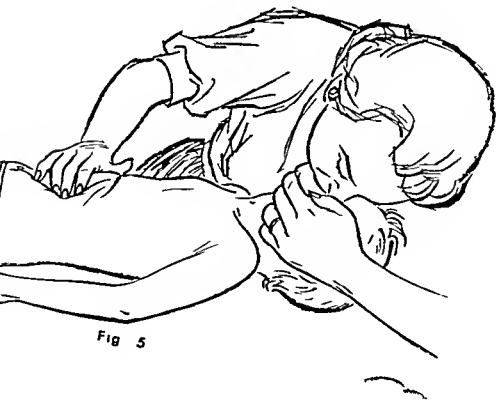
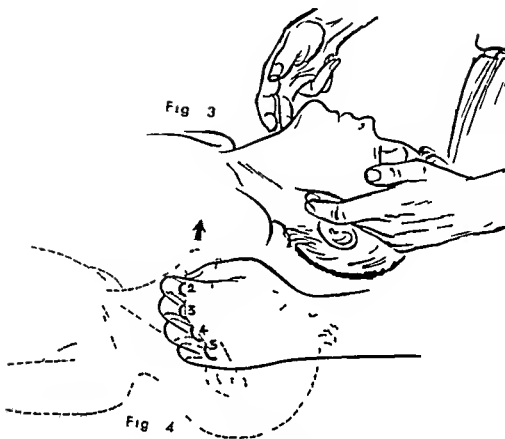


Fig 5



June 1957)

# ARTIFICIAL RESPIRATION



20 cycles per minute After every 20 cycles you should rest long enough to take one deep breath If at any time you feel resistance to your breathing into the child and the chest does not rise repeat Step 2, then quickly resume mouth to-mouth breathing

### USE FOR INJURED ADULTS

The question often arises concerning a technic to use on adults when the chest cage is injured and compression of the chest would do further damage, or when fractured upper extremities would eliminate the expansion phase of "push pull" technics The mouth to-mouth or mouth to-nose technic may be used in these cases however, the cycle should be slower than that used for children Approximately 12 cycles per minute should be adequate The lower jaw must be held in the "jutting out" position with both hands at all times

---

**ACKNOWLEDGMENT** The editors are indebted to the American National Red Cross and the National Academy of Sciences—National Research Council for permission to publish the text of this technic and to the Red Cross for use of their excellent illustrations



## Clinicopathologic Conference

U S Naval Hospital Portsmouth, Va •

### CARDIAC ARRHYTHMIA

**Summary of Clinical History** The patient was 33 years old when, on 26 November 1956, he was admitted to a hospital for the first time in his life. During examination for extension of enlistment after 10 years of active duty in the U S Navy, it had been noted that his pulse was markedly irregular. He was not conscious of any irregularity and had no complaints of any sort. He had had the usual childhood diseases, none of them serious, and at the age of nine had had pneumonia without any sequelae. He remembered no operations, accidents, or any other serious illnesses. Particularly, there was no history of rheumatic fever. His mother and father had died of unknown causes while he was an infant. Two siblings were alive and well.

During his 10 years in the Navy, he had been in the Philippines, Alaska, South America, United States, Mediterranean, Greenland, South America, and the United States, in that order. He drank about two bottles of beer a day and occasionally used hard liquor. For some years he had smoked one and a half packages of cigarettes per day.

On review of systems, the only positive finding was that the patient occasionally had abdominal pain upon missing a meal. This pain was aggravated by alcohol.

Rear Adm Ocie B Morrison Jr MC USA Commanding Officer From the Pathology  
Service Capt Wilmot F Pierce MC USN Chief



**Physical Examination** The patient was 67 inches tall and weighed 160 pounds. His temperature was 99° F, pulse, 80 and blood pressure, 116/78 mm/Hg. He was well developed, well nourished, and in no acute distress. One examiner thought that there was slight thickening of the walls of the retinal arterioles. Other than this, there were no abnormalities of the head or neck. His chest was normal in size and shape. Loud expiratory rales were heard at the left base of the chest. His heart was not enlarged to percussion; no murmurs were heard, but the second sound, just to the left of the sternum at the level of the 5th interspace, was split. His pulse was totally irregular and there was a pulse deficit. His hands were cool and damp and fine tremors of his outstretched fingers were noted. There were no other significant physical findings.

**Laboratory Studies** Hemoglobin was 14.5 grams per 100 ml and the leukocyte count was 6,300. Sedimentation rate was normal. The urine was clear, alkaline, had a specific gravity of 1.020, normal albumin and sugar, and there were from 1 to 2 leukocytes per high power field. The serum cholesterol was 294 mg per 100 ml. PPD (first and second strengths) tuberculin tests and the Kahn test for syphilis were negative.

A roentgenogram of the chest in the posteroanterior position showed a slight prominence of the heart in the region of the left ventricle, the widest diameter measuring 14 cm in comparison with 29 cm for the widest intrathoracic diameter. Old healed fibrotic disease was evident in the right apex, and there was an increase in markings in the right lower lung field. Oblique views with barium swallow showed no definite chamber enlargement. Cholecystography indicated normal function without evidence of cholelithiasis.

An electrocardiogram recorded an auricular rate of 60, a ventricular rate of 70, and a sinus tachycardia with frequent runs of many multifocal ventricular premature beats from as many as five different foci (fig. 1). At times as many as nine consecutive ventricular premature beats appeared. The T waves were inverted in leads 3 and V<sub>4</sub>.

**Course in Hospital** Except for 99° F on admission the patient's temperature was not above 98.6° throughout his stay in the hospital. Pronestyl (brand of procaine amide hydrochloride) 1,000 mg daily in four doses was started when he was admitted, and this was gradually increased to 4,000 mg daily by 20 December. An electrocardiogram on 3 January showed fewer premature beats but widening of the QRS complexes. The dose of Pronestyl was diminished to 750 mg four times a day. A basal metabolic rate on 10 January was plus 17. The patient was completely asymptomatic up and about on the wards and he was allowed to leave the hospital on regular liberty until 24

January On that day when he was walking to the hospital, after spending the night at home, he had severe epigastric pain and vomited once. Another electrocardiogram showed some increase in prominent Q waves but physical examination revealed no abnormalities other than an irregular pulse. In a gastro-intestinal

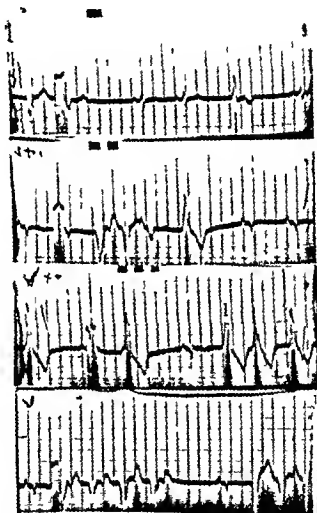


Figure 1 Electrocardiogram showing multiple multifocal ventricular premature beats

roentgenographic series on 8 February, inconstant spasm and a crater measuring 1 cm in diameter were demonstrated in the prepyloric area of the stomach, stomach peristalsis was sluggish, and there was minimal residual barium in five hours. The esophagus was normal. The cardiac shadow in these films was enlarged in all diameters. Therapy with Amphogel (brand of a suspension of aluminum hydroxide) and belladonna was instituted and very soon his abdominal pain disappeared. Fluoroscopy on 3 March showed only slight spasm in the prepyloric portion of the stomach, and at intervals, this region filled out well and peristalsis was observed to pass through it.

On 17 January a clinical board concluded that further active duty was contra indicated and recommended that he appear before a Physical Evaluation Board. The diagnosis was ventricular premature contractions cause unknown.

On 7 March, he died while asleep during a "sort of convulsion."

### DISCUSSION

Doctor Greer: A young man 33 years old, was found to have an irregular pulse when he was being examined for re-enlistment in the U. S. Navy and he was admitted to the hospital for study. He had no complaints at the time and the only positive finding in a review of systems was abdominal pain that was said to occur when his stomach was empty. The physical examination revealed questionable sclerosis of the retinal arteries, loud expiratory rales at the left lung base, a split second heart sound at the left sternal border, totally irregular pulse, cool damp palms and a fine tremor of the outstretched fingers. The results of laboratory examinations were within normal limits except for a slightly elevated blood cholesterol. A roentgenogram of his chest revealed some prominence of the left ventricle, evidence of old healed fibrotic disease in the right apex and some increase in markings in the right lower lung field. Cardiac fluoroscopy did not reveal any significant chamber enlargement. Roentgenograms of the gallbladder were negative. The electrocardiograms showed an auricular rate of 60 and a ventricular rate of 70 with numerous and multifocal premature ventricular contractions, sometime as many as nine at a time. This makes one think that the many consecutive ventricular components were probably runs of ventricular tachycardia rather than just simple premature ventricular contractions.

The course in the hospital was very uncomplicated. The patient was given Pronestyl in rather large doses and following this there were fewer premature ventricular contractions. His basal metabolic rate was plus 17. A peptic ulcer was discovered while he was under observation and this responded well symptomatically. According to the report the second gastro intestinal series showed some improvement. A repeat roentgenogram of the chest showed the heart to be enlarged in all diameters. He appeared before a clinical board with a diagnosis of ventricular premature contractions, cause undetermined, and on 7 March he died while asleep during a "sort of convulsion." There are several things that I would like to ask. First of all I would like to know if he was overweight. Do you happen to know his weight?

Doctor Pierce: He weighed 160 pounds and he was 67 inches tall.

Doct. Greer: Was his blood Kahn test negative?

Doctor Pierce: Yes, the Kahn was negative.

Doctor Greer: And he was not gastroscopied?

June 1957)

# CLINICOPATHOLOGIC CONFERENCE

859

Doctor Pierce He was not

Doctor Green: It seems that the occurrence of premature beats was the main reason that this man was in the hospital, and premature beats are not too important clinically unless they do occur from multiple foci and occur frequently. It is said as I mentioned before, that runs of more than three consecutive premature ventricular contractions are pretty good evidence of paroxysms of ventricular tachycardia. When such contractions occur from multifocal areas, I think one can fairly safely say that there is organic heart disease. We are, occasionally, unable to determine the underlying cause of such heart disease, but I think these findings do indicate advanced myocardial disease and I think that anytime they occur there is the possibility of impending ventricular tachycardia leading to ventricular fibrillation. Actually there is not much else to go on in this case. There was no hypertension. There was no electrocardiographic evidence of myocardial damage in the sense of infarction although because of the premature beats myocardial disease probably did exist. We have no evidence of thyrotoxicosis. He had a tremor, but he had cool moist hands and thus is against thyroid disease, and an examination of the neck was negative. The Kahn test was negative, so syphilitic heart disease is also rather remote. So I think that probably if we are going to say that the man had heart disease it leaves us with arteriosclerotic heart disease, and this is uncommon in a young man of 33 years. However, considerable investigation of coronary artery disease in young men has been carried out by Yater and associates<sup>1</sup> who reported over 800 cases in men ranging from ages 18 to 40 years, and by French and Dock<sup>2</sup> who reported 80 cases. The findings were about the same: 90 per cent of the patients were overweight, 50 per cent died during vigorous effort and 10 per cent died during sleep. Arteriosclerosis of the coronary arteries was found in all but there was generalized arteriosclerosis in only a very small group. So this is a localized, selective type of arteriosclerosis. In 80 autopsies on these young men 59 per cent showed old infarction and only 19 per cent showed new infarction. All died suddenly and it is interesting to note that very few of the men who died had cardiac hypertrophy. Here we have a man who died suddenly and I think that probably a few words should be said about sudden death in young men. It is distressing to the doctor when a young man whom he is treating dies. I think that the responsible mechanism for sudden death is irreversible cerebral anoxia. It results from sudden local traumatic metabolic toxic or vascular damage to the brain. There may be exsanguinating hemorrhage resulting in medullary anoxia, or hemorrhage into the pericardial sac with tamponade. A massive pulmonary embolus can cause obstruction to blood flow and lead to sudden cerebral anoxia that can cause sudden death. Ventricular asystole or fibrillation can cause sudden death. Many times when death occurs suddenly the pathologist finds nothing to explain the cause. Death may also be caused by cessation of the heart beat that can result from ventricular fibrillation or cardiac standstill. In animal

experimentation when a coronary vessel is tied, electrocardiograms reveal that death is due to ventricular fibrillation. We also know from electrocardiographic evidence that patients in ventricular fibrillation die suddenly. The commonest cause of sudden death is vascular disease of the heart. A ruptured ventricle, complete heart block, ruptured aortic aneurysm, perhaps ventricular fibrillation, and sometimes quinidine therapy are causes of sudden death. Cerebral complications can also cause sudden death. Diseases of the digestive tract and urinary tract can also lead to sudden death. In 60 to 80 per cent of the sudden deaths due to cardiovascular disease, coronary arteriosclerosis is found. It is also interesting to note that studies of a large number of young men who died suddenly showed no evidence of recent infarction and frequently there was no evidence of coronary occlusion but in all the cases there was evidence of coronary arteriosclerosis.

I do not believe that this man had valvular heart disease because he had no murmurs. The commonest valvular disease to cause sudden death is calcific aortic stenosis. Cerebrovascular accidents are not very common causes of sudden death. In fact, about the only cerebral lesion causing sudden death is rupture of an aneurysm of the basilar artery. An embolus or hemorrhage into the brain does not cause death for 12 to 14 hours; usually it is 2 to 14 days before death occurs. Cerebral embolism occurs most commonly with heart disease. In children, rheumatic heart disease and subacute bacterial endocarditis and in adults, auricular fibrillation and coronary thrombosis are the two most frequent causes of this. We have several distinct possibilities for the cause of this man's death. In reverse order, I think that a pulmonary mechanism is not too likely. If he had had a pulmonary embolus, it would have to come from the right side of the heart and thrombi in the right side of the heart, especially from studies of young men, are not nearly as common as thrombi in the left side. As far as gastrointestinal disease is concerned, there is not much to go on. The man apparently had an ulcer; it was prepyloric; it might have been malignant but it improved under treatment. We have no evidence that blood came either from the mouth or from the rectum when he died but I suppose that he might have exsanguinated. May I ask who saw him die? Did a medical officer see him die?

Doctor Pierce: He died at home.

Doctor Greer: This sort of convulsion must have been the words used by his wife.

Doctor Pierce: Yes.

Doctor Greer: Well, it is difficult to diagnose from a wife's opinion as to how her husband died. Considering a neoplasm, he might have had a metastatic neoplasm from a carcinoma of the stomach but that is not likely. So actually, we are left with cardiovascular death. I think it is unlikely that this was due to myocarditis. We have no

June 1957)

# CLINICOPATHOLOGIC CONFERENCE

861

evidence that he had infection or postinfectious diphtheritic or rheumatic myocarditis. This could account very well however, for the numerous premature ventricular contractions. He also had no symptoms of heart failure although there was roentgenographic evidence of a heart enlarged in all diameters. We have no evidence that there was dyspnea or ankle edema. There is a remote possibility that there could have been some pericardial involvement, or that he could have had metastatic or primary tumor in the pericardial sac or the myocardium. It is also possible that this man could have ruptured a ventricle into the pericardium causing cardiac tamponade. I believe that the man died from coronary arteriosclerosis. I think that the cause of death was ventricular fibrillation.

Doctor Joraszewski: Apparently the patient was surveyed with the diagnosis of ventricular premature contractions. I don't see why any body would do that if his cardiac shadow increased in size from the time he was admitted. Was he discharged from the service?

Doctor Pierce: He was waiting to hear from the Physical Examination Board when he died.

Doctor Joraszewski: What I am trying to bring out is why he had cardiac enlargement from the time of admission to the second time that the chest films were taken. There is no mention here of any kind of examination of the chest circulation times, venous pressure determinations or anything like that. I don't believe he had arteriosclerotic heart disease. Cardiac arrest was due to either fibrosis of the lungs or a tumor of the heart either primary or secondary.

Doctor Gorlin\*: Well, I would agree that this is a most unusual course in a man of 33. I would think that he had some systemic type of infiltrative disease of the heart but I don't know where to begin with the amount of information that is presented. It was initially thought that there was acute change in heart size as well as arrhythmia.

Dr. Greer's diagnosis

Coronary arteriosclerosis and ventricular fibrillation

Dr. Joraszewski's diagnosis

Fibrosis of the lungs or heart tumor, either primary or secondary

Dr. Gorlin's diagnosis

Infiltrative disease of the heart

## PATHOLOGIC FINDINGS

Doctor Pierce: At autopsy the heart weighed 500 grams. Patchy gray opacities somewhat granular in appearance were evident over the epicardium of the left ventricle. All the chambers of the heart

Capt. Edward J. Joraszewski, MC, USN, Medical Service  
\*Lt. Richard Gorlin, MC, USNR, Medical Service

were dilated, particularly the left ventricle. The right auricle was moderately dilated. The endocardium of the papillary muscles of the right ventricle was slightly roughened by pinhead-sized glistening gray nodules. Similar but more numerous translucent nodules were incorporated in the endocardium of the left ventricle particularly concentrated below the anterior cusp of the aortic valve. The myocardium of the right ventricle was thin and pale and there were a few broad gray scars on the cut surfaces. The myocardium of the interventricular septum was about average in thickness but on sectioning instead of the usual red-brown color the cut surfaces were streaked gray yellow gray red yellow and red. No normal appearing myocardium could be seen grossly. In the left ventricle the myocardium was somewhat thin particularly toward the apex, and the cut surfaces were somewhat mottled deep red, red yellow gray yellow and gray. Numerous dense gray scars up to 1.5 cm in size were scattered throughout. The myocardium generally was flabby and somewhat friable. The coronary arteries were somewhat thickened and rigid and there were numerous yellow atheromatous intimal plaques. The lumens were somewhat diminished but nowhere was there any evidence of occlusion by thrombi, plaques or emboli.

The lungs were somewhat edematous. There were some apical adhesions. A small nodule was present just beneath the pleura of the right lower lobe on the lateral aspect 0.6 cm in diameter. Dense fibrous adhesions were present between the visceral and parietal pleura of the right lower lobe.

The liver weighed 2,200 grams. Glistening translucent minute gray opacities were scattered over the cut surfaces and seemed to follow the distribution of the large vessels. The spleen weighed 400 grams and was soft. No nodules were evident.

A shallow ulceration was present on the lesser curvature of the stomach, approximately 1 cm proximal to the pyloric ring. This was 0.7 cm in diameter and there was some puckering of the adjacent gastric mucosa. Mild gray thickening was evident on the serosal surface opposite the ulceration. There were no abnormalities of any other portion of the gastro-intestinal tract.

There was moderate enlargement of all lymph nodes, especially those in the peritoneal cavity and particularly those about the bile ducts. Except for mild atheromatous changes of the aorta and of the arteries at the base of the brain there were no significant gross findings in any of the other tissues.

Histologically there were granulomatous lesions in almost every organ of the body (fig. 2). These lesions were characteristic of sarcoidosis. No pathogenic organisms were isolated from the cultures of tissue taken at the time of autopsy and special stains showed no acid fast organisms or fungi in the tissues. A hamster was inoculated with material from a lymph node. This animal killed six weeks later showed no significant tissue alterations.

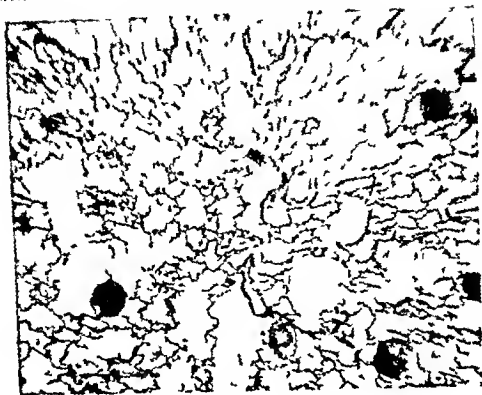


Figure 2 Sarcoid nodules in lung ( $\times 5$ )

The heart was extensively involved by the granulomatous process (fig 3) and in addition there were extensive regions of fibrosis some with hyalinization. There was no particular concentration of the lesions in any of the divisions of the heart. The right and left ventricles papillary muscles and interventricular septum were all sites of these lesions. Necrosis was not a feature of any of these lesions. It is estimated that about one third of the myocardium was involved, either by scarring or by the granulomatous lesions.

In sections through the gastric ulcer epithelium covered the entire surface of the crater but there was loss of submucosa, and muscularis mucosa and a portion of the muscularis. The epithelium lay on a very thin layer of smooth muscle fibers. Considerable infiltration of the underlying muscle with lymphocytes and large mononuclear leukocytes had occurred, and the vascularity in this portion of the wall was increased. Thickening of the serosa had occurred with proliferating connective tissue. Numerous granulomatous lesions similar to those seen in the heart and the other tissues were evident in the mucosa submucosa and the muscularis mucosa of the stomach proximal to the ulcer (fig 4).

Myocardial sarcoidosis is not a common cause of sudden and unexpected death. On the other hand involvement of the heart, either directly as in this case or through the pulmonary fibrosis associated with this disease does occur quite frequently. In the 92 autopsied cases collected by Longcope and Freiman<sup>3</sup> the heart was directly invaded by the granulomatous lesions in 18 (20 per cent). Five of these patients had died suddenly and unexpectedly. Abnormal electro



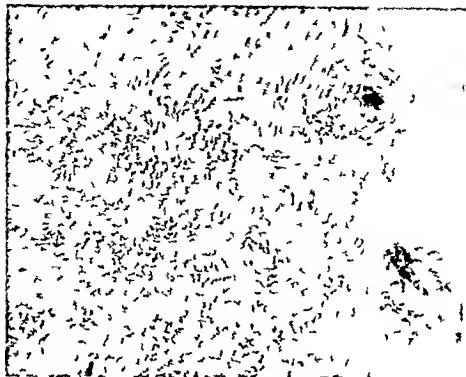


Figure 3. Myocardium and epicardium showing sarcoid nodules, fibrosis, and cellular infiltration. ( $\times 10$ )

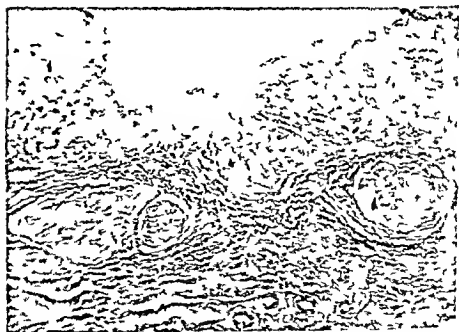


Figure 4. Sarcoid nodules in submucosa of the stomach. ( $\times 10$ )

cardiograms in the course of sarcoidosis are reported fairly frequently in the literature in various series which have been published, abnormal electrocardiograms are the rule. This is due in most instances to damage resulting from pulmonary arterial hypertension. Inasmuch as involvement of the heart either primarily or secondarily can lead to myocardial failure this is a significant cause of death in patients dying directly of sarcoidosis. Myocardial involvement in the reported cases has varied from a few solitary nodules to extensive infiltration.

Involvement by sarcoidosis of the gastro-intestinal tract especially the stomach and duodenum probably occurs fairly frequently. Sirak<sup>4</sup> collected 12 cases from the literature and added one of his own. In these 13 cases there were ulcers of the lesser curvature in 3 and ulcer of the duodenum in 1. Other effects are antral deformities, pyloric narrowing or deformity, constriction of the duodenum and linitis plastica.

#### Pathologic diagnoses

1 Sarcoidosis, with extensive fibrosis involving the myocardium, lymph nodes, lungs, liver, spleen, bone marrow, kidneys, prostate gland, stomach, thyroid gland, dura, and leptomeninges.

2 Prepyloric ulcer, lesser curvature of the stomach.  
Healed, with mild, chronic, interstitial inflammation.

#### REFERENCES

- 1 Yater W M, Traub A H, Brown W G, Fitzgerald R P, Geisler M A, Wilcox B B. Coronary artery disease in men 18 to 39 years of age: report of 866 cases, 450 with necropsy examinations. *Am Heart J* 36: 334-372, Sept 1948; 481-526, Oct 1948; 683-722, Nov 1948.
- 2 French A J and Dock W. Fatal coronary arteriosclerosis in young soldiers. *J A. M. A.* 124: 1233-1237, Apr 29 1944.
- 3 Longcope W T and Freeman D G. Study of sarcoidosis based on combined investigation of 160 cases including 30 autopsies from Johns Hopkins Hospital and Massachusetts General Hospital. *Medicine* 31: 1-132, Feb 1952.
- 4 Sirak H D. Boeck's sarcoid of stomach simulating linitis plastica: report of case and comparison with 17 recorded cases. *A. M. A. Arch Surg* 69: 769-776, Dec 1954.

ever if I did not ou line for you a few of the highlights of his life to indicate why this hospital is being named for him

General Ireland was born in 1867 in Columbia City Ind approximately 200 miles from Fort Knox the son of a family doctor At the age of 23 he received an M D degree from the Detroit College of Medicine and one year later another from Jefferson Medical College in Philadelphia That same year 1891 he applied for a commission in the Army Medical Corps and was the only one of 10 candidates to be commissioned Fifty-nine years later in 1952 at the age of 85 he died and was buried in Arlington



*Major General Merritte W Ireland, Surgeon General United States Army from 4 October 1918 to 31 May 1931 A large replica of this portrait now hangs in the main lobby of Ireland Army Hospital.*

General Ireland's early service was mostly on posts in the West but during the Spanish American War he went to Cuba with a division hospital and then to the Philippines for a tour of duty From 1902 to 1912 he served in the office of The Surgeon General much of the time as Chief of the Personnel Division Here he garnered experience and background which was to serve him to good stead in later years as Surgeon General

June 1957)

# IRELAND ARMY HOSPITAL

869

In World War I he became Chief Surgeon of the American Expeditionary Force, and won the highest commendation from his close personal friend, General Pershing. At the end of that war he was appointed Surgeon General and served in that capacity for 13 years until his



*Following the climax of the dedication ceremony Mrs Ireland stands in front of the dedicatory plaque which she has just unveiled with her son Doctor Paul M Ireland and Major General Silas B Hays The Surgeon General of the United States Army*

retirement in 1931. During his administration Walter Reed and Letterman Hospitals were rebuilt and William Beaumont Hospital was constructed. He established the Medical Field Service School in which thousands of officers and enlisted men of the Army Medical Service

have been trained And it was he who brought interns into our Army hospitals and began the professional training program of which we are so proud

In a lecture which he gave in Philadelphia in 1939 at the age of 72 General Ireland said "That I am the Army has made me what honors have come to me to brighten and ennoble my life, however undeserved were the free gifts of my comrades in the Army and of my Government The Army has always been my first love and I shall go to my grave believing that it is the truest exponent of American democracy and that in its Medical Department are to be found the highest ideals and principles of the healing art

Both the Army Medical Service and Fort Knox have reason to be proud to dedicate this hospital today to one who treasured and revered the Army as did Major General Merritte W Ireland

---

### TEACHERS OF MEDICINE

One of the diseases of our society is this erroneous belief that the brave new world will come to pass by miracles of structural design and intricate organisation alone Plans there must be but personalities must take precedence of plans The basic essential is to ensure that medical students both undergraduates and post graduates are associated with (not just taught by) those whose lives and work are examples of excellence in scholarship and professional skill These teachers must be ever dissatisfied with their efforts critical of themselves and others forever scheming and striving to test the truth of what appears to be known and planning to enlarge knowledge Among such there is no room for the complacent the arrogant the staunch upholder of tradition and the stout defender of the status quo The quality of our teachers is all important and a heavy responsibility rests on those who have to select the academic staffs and consultants responsible for medical education

—W MELVILLE ARNOTT M D  
in *Lancet* p 785 Oct 15 1955

# ROLE OF PHYSICIANS IN RECOMMENDATIONS OF COMPASSIONATE PERSONNEL ACTIONS

JAMES J GIBBS Major MC USA  
RALPH W MORGAN Major MSC USA

**A** WELL-KNOWN aspect of Army life is the lack of choice in the duration or location of duty assignments. This may produce stressful situations if members of the serviceman's family are unable to adjust to a particular environment or if his impending or actual separation from the family comes at a time when his presence is necessary because of serious illness, death, legal difficulties, or other problems in the immediate family. Aware of its responsibilities, the Army has provided for the alleviation of such family hardship through compassionate personnel actions. These include emergency leave, extension of such leave, deferment of overseas assignment, and compassionate reassignment.

The magnitude of this problem is emphasized by the approximately 2,000 requests for compassionate personnel action which reach the Office of The Adjutant General of the Army each month. This includes only those requests which are required by Army regulations to be processed by the Emergency Return Section of The Adjutant General's Office at Department of the Army level. Many others are voted upon by major commanders so that the total far exceeds 2,000 per month. Because the majority of requests for such actions involve physical and/or mental illness of a member of the serviceman's family, military and civilian physicians are frequently called upon for statements concerning the medical status of the dependent.

Medical reports frequently contain vague, incomplete information and unrealistic recommendations which result in a delay of administrative action, and reassignments by the serviceman and his family when requests are not favorably considered. A simple statement of the presence or absence of a physical or mental illness may present no difficulty, however, the emotional, legal, economic, social, and administrative aspects of a family medical problem may introduce complications which must be considered in the medical report.

From Professional Division Office of The Surgeon General Department of the  
Army Washington D C

In addition to safeguarding the serviceman and his family, the final decision must also consider the necessity of accomplishing the military mission. Whether compassionate personnel action would aid or correct the situation and not foster overly dependent behavior and thus initiate or continue maladjustment of the family to military life must also be considered. It should be recognized that in many cases a hardship exists which cannot be remedied by leave or reassignment but only by discharge from the service.

Each request for compassionate personnel action is handled on an individual basis. From an administrative standpoint it would be advantageous to include in *Army Regulations* the specific criteria used in determining the merits of each case. However, illness and other vicissitudes, with their diverse effects upon individuals, and the innumerable situations that can produce severe hardships, make it impossible to cover each situation. Therefore regulations can be used only as a guide.

### RETURN OF PERSONNEL TO U S

#### Reasons for Return

AR 608-40 states that the following or related cases will be considered as reasons for return of the serviceman to the United States or Territory of residence under emergency conditions for a period of 30 days:

a. When the death of the wife or unmarried minor child of a serviceman has been verified by the American Red Cross.

b. When the return of an individual will contribute to the welfare of a dying member of the immediate family (immediate family to include only father, mother, a person *in loco parentis*\* spouse, children, brother, sister, or only living relative). An example would be an elderly mother with a chronic heart condition which has reached a terminal stage.

c. Where, through the death or serious illness of, or accident to, a member of the individual's immediate family, important responsibilities are placed on the individual which must be met promptly, cannot be accomplished from overseas, and cannot be discharged by any other individual. For example, a spouse who develops an acute overt psychosis, leaving three minor children unattended.

d. For other emergency situations which may not specifically meet the above requirements but where the failure of the individual to return would create a severe and unusual hardship.

---

\* *Per* o t be c det d n loco parent s mu t have r pl ced ad a umed all of th oblig t o s of the natural pare t of the memb r (incl ding financial support) f r th bulk of th member s minor ty

on either himself or his family and the return is required within a period of 20 days

### **Return of Serviceman Requested by Family**

The procedure to be followed when family members request the return of military personnel to the United States or Territory of residence is as follows

a A request for return is submitted by family members to the local chapter of the American Red Cross. The American Red Cross obtains all information available, including medical documentations when indicated. The local chapter then forwards a report to its National Headquarters which in turn submits it to The Adjutant General, Department of the Army, Washington 25, D. C., or Commanding General of an area where authority from The Adjutant General is not required.

b Requests which reach the Emergency Return Section of The Adjutant General's Office are carefully reviewed. If information is incomplete, final decision may be delayed until additional reports are obtained. Favorable consideration results when the American Red Cross welfare reports and the medical statements indicate that the case has merit, and that the current Army mission allows the granting of the request. The officers of the Emergency Return Section are placed in a very difficult position if the physician lacks a proper appreciation and understanding of the military problem. The staff of the Emergency Return Section has access to expert medical opinion from the Office of The Surgeon General to assist them in evaluating medical problems.

*Case example 1* A five year old dependent daughter of a serviceman was diagnosed by a medical officer as suffering from bronchial asthma. He wrote a strong medical statement recommending that the serviceman be reassigned to a post in Arizona or Nevada for this reason. This recommendation was made in spite of the fact that the child had never resided in these States and her asthma appeared to be relatively well controlled on medication. Upon the advice of the Medical Consultant to The Surgeon General, this request for compassionate transfer was refused. The serviceman, incensed at what appeared to him to be a medical decision being made by a physician who had never seen his child, appealed to his Congressman, who also questioned the Medical Consultant's recommendation in this case.

*Comment* It can be seen that this medical recommendation resulted in the serviceman and his wife feeling as though an injustice had been done, even though sound medical experience dictated this course of action. Had the physician encouraged the parents to accept their child's illness and to follow the prescribed treatment it would have been better for all concerned.



In addition to safeguarding the serviceman and his family, the final decision must also consider the necessity of accomplishing the military mission. Whether compassionate personnel action would aid or correct the situation and not foster overly dependent behavior and thus initiate or continue maladjustment of the family to military life must also be considered. It should be recognized that in many cases a hardship exists which cannot be remedied by leave or reassignment but only by discharge from the service.

Each request for compassionate personnel action is handled on an individual basis. From an administrative standpoint, it would be advantageous to include in *Army Regulations* the specific criteria used in determining the merits of each case. However, illness and other vicissitudes with their diverse effects upon individuals and the innumerable situations that can produce severe hardships make it impossible to cover each situation. Therefore regulations can be used only as a guide.

### RETURN OF PERSONNEL TO U S

#### Reasons for Return

AR 608 40<sup>1</sup> states that the following or related cases will be considered as reasons for return of the serviceman to the United States or Territory of residence under emergency conditions for a period of 30 days:

a When the death of the wife or unmarried minor child of a serviceman has been verified by the American Red Cross.

b When the return of an individual will contribute to the welfare of a dying member of the immediate family (immediate family to include only father, mother, a person *in loco parentis*\*, spouse, children, brother, sister, or only living relative). An example would be an elderly mother with a chronic heart condition which has reached a terminal stage.

c Where through the death or serious illness of or accident to a member of the individual's immediate family, important responsibilities are placed on the individual which must be met promptly, cannot be accomplished from overseas, and cannot be discharged by any other individual. For example, a spouse who develops an acute overt psychosis leaving three minor children unattended.

d For other emergency situations which may not specifically meet the above requirements but where the failure of the individual to return would create a severe and unusual hardship.

---

\* Persons to be considered *in loco parentis* must have replaced and assumed all of the obligations of the natural parent. If the member (including financial support) is the bulk of the member's family.

on either himself or his family and the return is required within a period of 20 days

#### **Return of Serviceman Requested by Family**

The procedure to be followed when family members request the return of military personnel to the United States or Territory of residence is as follows

a A request for return is submitted by family members to the local chapter of the American Red Cross. The American Red Cross obtains all information available, including medical documentations when indicated. The local chapter then forwards a report to its National Headquarters which in turn submits it to The Adjutant General, Department of the Army, Washington 25, D. C., or Commanding General of an area where authority from The Adjutant General is not required.

b Requests which reach the Emergency Return Section of The Adjutant General's Office are carefully reviewed. If information is incomplete, final decision may be delayed until additional reports are obtained. Favorable consideration results when the American Red Cross welfare reports and the medical statements indicate that the case has merit, and that the current Army mission allows the granting of the request. The officers of the Emergency Return Section are placed in a very difficult position if the physician lacks a proper appreciation and understanding of the military problem. The staff of the Emergency Return Section has access to expert medical opinion from the Office of The Surgeon General to assist them in evaluating medical problems.

*Case example 1* A five year old dependent daughter of a serviceman was diagnosed by a medical officer as suffering from bronchial asthma. He wrote a strong medical statement recommending that the serviceman be reassigned to a post in Arizona or Nevada for this reason. This recommendation was made in spite of the fact that the child had never resided in these States and her asthma appeared to be relatively well controlled on medication. Upon the advice of the Medical Consultant to The Surgeon General, this request for compassionate transfer was refused. The serviceman, incensed at what appeared to him to be a medical decision being made by a physician who had never seen his child, appealed to his Congressman, who also questioned the Medical Consultant's recommendation in this case.

*Comment* It can be seen that this medical recommendation resulted in the serviceman and his wife feeling as though an injustice had been done, even though sound medical experience dictated this course of action. Had the physician encouraged the parents to accept their child's illness and to follow the prescribed treatment it would have been better for all concerned.

## FOREIGN SERVICE

## Personal Hardship

There is no specific regulation which deals with compassionate reassignment. Consequently most of the criteria stated in AF 614 30,<sup>2</sup> which deal with overseas deferments, are applied to such cases. This regulation states, in effect, that personnel alerted for or on orders to overseas commands, may be granted temporary deferment when compliance with such orders will impose hardship upon the individual or his family under the following criteria:

a Illness of a member of the immediate family of the individual provided that

(1) In the opinion of the attending physician

(a) The illness is such that the patient cannot reasonably be expected to live longer than one year

(b) The illness is of such a nature that the individual's presence is an important factor in the patient's recovery whereas his immediate departure might have a serious adverse effect upon the patient. A case having merit under this criterion would be that of a dependent recovering from a severe illness of recent onset such as coronary thrombosis

(c) The legal wife of the individual is in her seventh month of pregnancy (this criterion is utilized only for overseas deferment)

b Financial or domestic hardship involving the immediate family, provided that the individual's presence during the period of his deferment will effect reasonably permanent relief which cannot be achieved by other satisfactory means

## PRINCIPLES

Each request for compassionate personnel action requires documentation and the exercise of sound judgment before any action is taken. The physician's statement becomes of paramount importance in any such action and if he is to discharge satisfactorily his responsibility, he must be aware of certain stated and implied principles that in the final analysis determine the decision rendered in each case.

*The expeditious accomplishment of the Army mission is of primary importance.* When the medical officer makes a medical recommendation he may not be primarily concerned with the feasibility of his recommendation. A medical recommendation which is not consistent with the mission of the Army sets up a chain reaction which does not serve the best interests of the patient or the service. In case example 1 it is clear that the

Army could not be expected to utilize efficiently an individual whose assignment would be permanently limited to two states in the Southwest. Moreover, the normal vicissitudes of the service must be shared by all. Resignation or application for hardship discharge would be the proper solution for long term, family medical problems which do not lend themselves to service life, rather than expecting others in the Army to assume an unfair share of overseas or isolated assignments.

*The requested action must alleviate mental anguish and/or enable the serviceman to perform an emergent legal obligation for which he has primary responsibility.* The usual purpose of compassionate personnel actions is to relieve mental anguish on the part of the member and/or persons in his family. Mental anguish is a subjective state in which the individual suffers intense and painful psychic distress, such as guilt, anxiety, depression, and the like. The effect upon the individual of mental anguish ranges from temporary loss of emotional control through multiple somatic symptoms, to few or no external manifestations. Usually, however, there is great preoccupation with the family problem, which often results in inattention to duty and a marked decrease in motivation toward military service.

If the mission permits, it is to the benefit of the Army to alleviate the mental anguish of the member through a compassionate personnel action. In some cases because of marital estrangement, immature behavior patterns, or other reasons, the serviceman may not desire emergency leave or compassionate reassignment. However, when the serviceman has a primary legal responsibility which cannot be discharged without his presence, the proper headquarters may issue appropriate orders returning him to the United States even though he expresses no desire to do so.

*Case example 2* A serviceman had not communicated or lived with his wife for five years although he continued to support her and their child. When his wife became acutely psychotic while he was overseas, his emergency return was requested for the purpose of arranging for commitment of his wife and care of his child. He, however, showed no interest in returning to the Continental United States, but was ordered to do so because no one else was available to assume his legal obligation to care for his family.

*Severe objective hardships which can be alleviated only by the presence of the member must exist.* Since mental anguish is so subjective and highly personalized, the causative factors of the external stress necessary to induce mental anguish are widely among individuals. In view of this, it is not possible to list objective situations which will always result in mental anguish.

and even appear to be a likely candidate for psychiatric treatment. Many therapists state that the serviceman's return home is required before treatment can be successful. If we think of psychiatric treatment as a method for helping the patient achieve more maturity and develop better ways of adjusting to life's many frustrations and adversities with less discomfort, the serviceman's return home because of her emotional illness could be a deterrent to successful treatment by enhancing the amount of secondary gain by decreasing or eliminating motivation for treatment and by fixating and encouraging a pathologic pattern of behavior.

*Case example 4.* A recent case having some relationship to this point of view was that of a serviceman who requested a compassionate reassignment from his overseas duty station to a specific unit stationed in a fairly large city because of his wife's health. His wife's emotional illness dated back to 1940 when she first required treatment. She had required therapy intermittently since then and usually as the result of her husband's absence. Except for one brief period she refused treatment from Army psychiatrists. She never accompanied or joined her husband on his overseas tours because of her illness and the advice of her physician.

This patient had been seen by a number of psychiatrists and physicians. There was general agreement that she had chronic severe neurosis characterized by multiple phobias, depression, and panic states. She was described as an extremely dependent and insecure person who was unable to adjust well to responsibilities and to being alone.

*Comment.* While it is clear that the wife in this case and her husband both were suffering considerable mental anguish because of their enforced separation, it is also evident that the assignment of this serviceman as requested would not be equitable to others and would in no way contribute to a permanent solution to a problem which was essentially unsolvable within the Army environment. In this case resignation from the service was offered and was accepted by the serviceman as a solution to the problem his wife's emotional disability presented.

## PRACTICAL SUGGESTIONS

### Treatment

The medical officer must appreciate the fact that separation of a serviceman from his family may induce hardship, inconvenience, discomfort or anxiety. It is highly improbable that anyone, whether physician or layman, can completely alleviate these conditions. On the other hand, it is equally unreasonable to believe that the physician has nothing of value in his armamentarium for dealing with the emotionally distraught

dependent. This may not necessarily require medication or other formal treatment procedure, but may consist only of the reassurance that the patient gains from a thorough evaluation—followed by a calm summation of the facts and forthright discussion as to the course of action to be followed.

If, during the course of those procedures, the physician clearly defines the reality of the patient's situation and firmly indicates, when he believes the facts so warrant, that the serviceman's return is not necessary, the patient frequently will have a reasonable chance of remaining effective. Somatic complaints, or even true illnesses, are then less likely to become a route of escape. The patient is then better able to utilize her own emotional strengths and the variety of assistance which may be available from relatives or from various social service organizations.

Most therapeutic procedures will give discouraging results when the patient's presence in the physician's office is motivated not so much by incapacitating symptoms as by a desire for his support in requesting some type of compassionate personnel action. It behooves the physician to be alert to such a possibility if he is to be of service to his patient. His therapeutic efforts will be futile until he clarifies his position. When the patient has been informed that the doctor will prescribe treatment as indicated by his examination and will not give the patient the statement he or she desires unless indicated, the doctor and patient will no longer be working at cross purposes. This mutual understanding then may pave the way for constructive therapeutic endeavors.

Most medical officers will recall at least one case in which the patient failed to keep future appointments or in other ways indicated little motivation for further medical assistance after she had obtained a favorable medical statement—only to return at a later date when the request for compassionate personnel action was denied.

#### **Referral to Social Service**

When the dependent is so emotionally immature or upset that she does not accept a medical recommendation made in the foregoing manner, the physician is often tempted to make recommendations which are unjustified by the facts of the case because of a personal need to "do something," and because he is unaware of the many agencies which are usually available to assist him in cases of this nature.

When the physician has determined that a medical recommendation for compassionate personnel action is not justified, or he desires an objective study of the dependent's situation prior to making the actual determination, he will find that referral of the patient to a qualified social agency is usually quite

helpful. In hospitals referrals may be made to the Military Social Work Service or the American Red Cross Hospital Social Service. In small hospitals or in dispensaries in civilian communities the dependent can be referred to the local American Red Cross Chapter or other available social agency.

Social workers are often of distinct value in providing dependents with the emotional support they may require to continue functioning in times of illness or other stress, and in mobilizing community resources to help solve or alleviate the patient's problem. The physician who refuses to make an unjustified medical recommendation for a compassionate personnel action at the behest of an immature or neurotic dependent and who follows through by a referral to a competent social agency is acting in the best interest of the patient. The serviceman the Government and himself. Unless such referral is made the dependent often continues to "shop" for a medical recommendation to the detriment of herself and the medical facilities which she frequents—especially if she is ultimately successful in her efforts.

#### Content of Medical Recommendations

The content of the medical recommendations should conform to the principles of sound medical practice. It is most important for the doctor to use factual descriptions if his report is to reflect accurately his evaluation of the patient. The use of general terminology which can be interpreted in many ways and which does not indicate the degree of incapacitation seriously limits the value of a medical evaluation. Terms such as "anorexia" and "insomnia" only mean that the patient has difficulty in eating and sleeping. To say, however, that the patient lived on cigarettes and coffee to the point that she has lost 10 pounds within 2 weeks and has slept no more than 1 to 2 hours each night during the same period of time clearly communicates to someone else the severity of the symptoms.

Pertinent historical data should not be sacrificed for the sake of brevity. When compassionate personnel action of some type is being considered it is important to have an impression of the patient's past performance when confronted with a stressful situation. One may find that the patient reverts to habit patterns which could aggravate an organic illness or result in serious neglect of minor children. More often, however, it is apparent that the subjective complaints become aggravated in the absence of objective evidence that the illness has become more severe. Where the information requested is too voluminous or detailed for inclusion in an Army Red Cross report or a telegram it should be forwarded by the next most expeditious means.

No medical report is complete without mentioning treatment. In addition to the type and duration of therapy, the patient's

motivation and cooperation is worthy of comment since no treatment program is of value unless the patient adheres to it. Where secondary gain from illness is a factor it may at times be naive to assume that a patient will diligently follow the doctor's orders.

Diagnosis can usually be stated clearly, but the physician may be reluctant to make statements as to prognosis. Some estimation of prognosis is necessary in considering compassionate personnel actions to avoid premature or delayed assignment changes which hinder the effectiveness of the soldier and increase rather than decrease the mental anguish and hardship involved.

*Case example 5* The child of a serviceman was diagnosed as having acute leukemia. For medical reasons the family was not fully informed of the nearness of the child's death. The serviceman, upon receiving orders for overseas, complied with these orders, only to find it necessary to return within a few months in the final weeks of the child's life. Had the physician taken the initiative in this case in encouraging the serviceman to apply for deferment from overseas movement substantial mental anguish would have been saved this family and the business of the Government could have been conducted more efficiently.

The physician should not include in his medical statement unverified statements from the patient. Overtreatment in the form of recommending compassionate reassignment when an emergency leave would suffice, or otherwise letting the patient dictate the form and duration of treatment, should be avoided in the best interest of the patient and the service.

#### **Administrative Considerations**

Local policy accounts for wide variations in the manner in which medical statements are initially processed. In some facilities all medical statements must be routed through the Adjutant, in others the registrar or commanding officer of the medical holding detachment had this responsibility. In absence of policy in this regard the medical officer would be well advised to route all such statements through the administrative office responsible for the maintenance of the patient's records. This is to protect the medical officer and his unit commander against administrative or legal repercussions because of an unauthorized release of medical information. In case of patients not subject to military law, no formal medical statement should be released without first obtaining specific written permission from the patient, except under the provisions of paragraph 15 a, AR 345-20.

#### **Recommendations**

It is believed that by giving serious consideration to the principles already mentioned, part of the physician's dilemma



may be solved Based on these principles he may come to one of three conclusions regarding a request for compassionate personnel actions Proper recommendations can then be made as follows

- 1 The case has merit and favorable action is justifiable
- 2 The case lacks merit and favorable action is not necessary
- 3 The condition in question is chronic in nature and the problem it has created remains unsolvable within the Army environment The same may be true where the dependent has a character and behavior disorder which is so severe that the serviceman's absence inevitably results in the neglect of minor children economic disaster or antisocial behavior which realistically hinders the serviceman's performance of duty

### CONCLUSION

An attempt has been made to provide physicians with a proper appreciation of their role in recommending compassionate personnel actions in relation to members of the Army The military medical psychiatric social and administrative aspects of medical recommendations for such actions have been discussed and practical suggestions made in the writing of medical statements and for improving the care of patients seeking compassionate personnel actions

### REFERENCES

- 1 AR 608-40 (14 Feb 1956) Return of Military Personnel to U S or Territory of Re deoc for Emergency Reasons
- 2 AR 614 30 (14 Mar 1955) Foreign Service

# ARMY TESTS FOR ASSESSMENT OF INTELLECTUAL DEFICIT

ERNEST K. MONTAGUE, *Lieutenant Colonel MSC USA*

HAROLD L. WILLIAMS, *Captain MSC USA*

ARDIE LUBIN, *Ph D*

CHARLES F. GIESEKING, *M A*

**T**HE estimation of cognitive deficit caused by illness is of importance to the military medical services. In the Army, all enlisted personnel take two tests of mental ability when they enter, and these tests can be used as estimates of the premorbid intellectual level of a patient. The same tests can be used after injury or illness to measure any intellectual deficit that results.

The first section of this article describes the tests administered at entry into the Army. The second section furnishes technical data for the assessment of intellectual deficit. The third section provides a basis for comparing scores on the Army Classification Battery with scores on the Wechsler-Bellevue scale.

## THE ARMY TESTS

At the present time each enlisted man takes two kinds of tests: (1) the Armed Forces Qualification Test (AFQT), which is used to estimate intellectual level, and (2) the Army Classification Battery (ACB), which is used for occupational classification. All enlisted men in the Armed Forces take the AFQT. However, the Air Force and Navy have developed their own classification batteries.

Both the AFQT and the ACB were developed from the Army General Classification Test (AGCT), which was administered to all Army enlisted men from 1940 to 1945. The AGCT was a spiral omnibus test (i.e., the items were arranged in order of increasing difficulty and a single score was obtained) using three types of items (spatial visualization, vocabulary, and arithmetic reasoning). This score was adjusted so that the general mean was 100, and the standard deviation was 20.

---

From Walter Reed Army Institute of Research, Walter Reed Army Medical Center, Washington, D. C. Col. Montague is now assigned to Office of the Surgeon General, Department of the Army, Washington, D. C.

The AFQT is also a spiral omnibus test. The scores are percentiles going from 0 to 100. This test has been revised periodically to take care of security leaks, obsolescence of items, revised standards and improved methods of testing. Forms 1 and 2 of the AFQT were used from 1950 to 1952. They contained the same three types of items found in the AGCT (verbal analogies, arithmetic reasoning, and spatial relations). Forms 3 and 4 of the AFQT were used from 1953 to August 1956. These forms introduced tool usage items. Altogether there were 100 items, 25 of each type. Forms 5 and 6 are now being used. They are essentially similar to Forms 3 and 4.

The ACB has been given to all enlisted men inducted into the Army since 1948. There are 10 tests in the ACB. These tests are used by the Classification Officer for assignment of Enlisted Men to various military occupations. As in the AGCT, the mean of each test is 100 and the standard deviation of each test is 20.

The ten ACB tests are described below. With the exception of the Radio Code Aptitude Test, all the ACB tests are in paper and pencil form.

### Army Classification Battery (ACB) Tests

**1 Reading and Vocabulary Test, RI 1 (PRT 1161) and RV 2 (PRT 1164)** This test contains a number of reading passages of one or more paragraphs. Several four alternative multiple choice items are based on the content of each paragraph. The reading matter varies from a simple description of Army camp activities to complex technical information. There are 53 items; the time limit is 25 minutes.

**2 Arithmetic Reasoning Test, AR 1 (PRT 1167) and AR 2 (PRT 1170)** In this test each item is an arithmetic problem presented verbally, with four alternative responses. Some items are based on scales, dials, tables, or graphs. There are 53 items; the time limit is 35 minutes.

**3 Pattern Analysis Test, PA 1 (PRT 1173) and PA 2 (PRT 1177)** In this test a two-dimensional pattern with numbered lines is presented along with the corresponding three-dimensional figure made by folding the pattern along the indicated lines. The edges of the figure are lettered. The examinee is required to identify the lettered edge of the figure corresponding to a numbered line in the pattern. The numbers in the pattern are the item numbers and the letters of the figure are used to form five alternative responses for each item. There are 50 items; the time limit is 20 minutes.

**4 Mechanical Aptitude Test, MA 5 (PRT 1157) and MA 6 (PRT 1158)** In this test each item consists of a figure illustrating

some physical principle and a verbal question with two, three, or four alternative responses. There are 45 items, the time limit is 15 minutes.

5 *Army Clerical Speed Test, ACS-1 (PRT 686) and ACS 2 (PRT 690)* This test consists of two parts, both highly speeded and administered with separate time limits.

(a) In Part I, Number Reversal (125 items) each item consists of two numbers. There are two alternative responses to indicate whether or not the second number is exactly the reverse of the first. The time limit is 5 minutes.

(b) In Part II, Coding (100 items), there is a key containing 10 words. Each word in the key has a number that is associated with it. Each item presents a word followed by the 10 alternative numbered responses in the key. The time limit is 5 minutes.

6 *Army Radio Code Aptitude Test, ARC-1 (PRT 78)* This is an auditory test, recorded on four phonograph records which include directions for the examinees. The first part of the test is composed of 270 learning exercises which are designed to teach the examinee the code signals for the three letters I, N, and T. These items are presented at approximately 4 to 7 words per minute. Immediately after the learning exercises, a test of 150 items is given to measure how accurately the three code signals can be recognized at varying speeds. The first 75 items are presented at approximately 15 words per minute, and the second 75 at approximately 21 words per minute. Responses are recorded on machine scorable answer sheets presenting the three alternatives for each item.

7 *Shop Mechanics Test, SM-1 (PRT 476) and SM-2 (PRT 477)* In this test each item presents a drawing illustrating some mechanical principle or tool usage, followed by a four alternative question. There are 40 items, the time limit is 15 minutes.

8 *Automotive Information, AI-1 (PRT 468) and AI-2 (PRT 469)* In this test each item is a four alternative question about the identification or operation of automobile parts. Many items are based on pictures or diagrams. There are 40 items, the time limit is 15 minutes.

9 *Electrical Information Test, EI-1 (PRT 691) and EI 2 (PRT 692)* In this test each item is a four alternative question on some element of electrical information. Many items are based on pictures or schematic diagrams. There are 40 items, the time limit is 15 minutes.

10 *Radio Information Test, RI 1 (PRT 693) and RI 2 (PRT 694)* In this test each item is a four alternative question on some aspect of radio information.

The AFQT is also a spiral omnibus test. The scores are percentiles going from 0 to 100. This test has been revised periodically to take care of security leaks, obsolescence of items, revised standards and improved methods of testing. Forms 1 and 2 of the AFQT were used from 1950 to 1952. They contained the same three types of items found in the AGCT (verbal analogies, arithmetic reasoning and spatial relations). Forms 3 and 4 of the AFQT were used from 1953 to August 1956. These forms introduced tool usage items. Altogether there were 100 items, 25 of each type. Forms 5 and 6 are now being used. They are essentially similar to Forms 3 and 4.

The ACB has been given to all enlisted men inducted into the Army since 1948. There are 10 tests in the ACB. These tests are used by the Classification Officer for assignment of Enlisted Men to various military occupations. As in the AGCT, the mean of each test is 100 and the standard deviation of each test is 20.

The ten ACB tests are described below. With the exception of the Radio Code Aptitude Test, all the ACB tests are in paper and pencil form.

### Army Classification Battery (ACB) Tests

**1 Reading and Vocabulary Test RV 1 (PRT 1161) and RV 2 (PRT 1164)** This test contains a number of reading passages of one or more paragraphs. Several four alternative multiple choice items are based on the content of each paragraph. The reading matter varies from a simple description of Army camp activities to complex technical information. There are 53 items; the time limit is 25 minutes.

**2 Arithmetic Reasoning Test AR 1 (PRT 1167) and AR 2 (PRT 1170)** In this test each item is an arithmetic problem presented verbally, with four alternative responses. Some items are based on scales, dials, tables or graphs. There are 53 items; the time limit is 35 minutes.

**3 Pattern Analysis Test PA 1 (PRT 1173) and PA 2 (PRT 1177)** In this test a two dimensional pattern with numbered lines is presented along with the corresponding three dimensional figure made by folding the pattern along the indicated lines. The edges of the figure are lettered. The examinee is required to identify the lettered edge of the figure corresponding to a numbered line in the pattern. The numbers in the pattern are the item numbers and the letters of the figure are used to form five alternative responses for each item. There are 50 items; the time limit is 20 minutes.

**4 Mechanical Aptitude Test MA 5 (PRT 1157) and MA 6 (PRT 1158)** In this test each item consists of a figure illustrating

TABLE 1 Median intercorrelations of the Army Classification Battery Tests

	RV	AR	PA	MA	ACS	ARC	SM	AI	EI	RI
RV	1 0	0 68	0 55	0 50	0 50	0 40	0 60	0 40	0 45	0 25
AR	0 68	1 0	0 60	0 55	0 50	0 45	0 60	0 45	0 50	0 30
PA	0 55	0 60	1 0	0 50	0 50	0 40	0 50	0 40	0 45	0 25
MA	0 50	0 55	0 50	1 0	0 45	0 35	0 70	0 60	0 50	0 30
ACS	0 50	0 50	0 50	0 45	1 0	0 45	0 45	0 25	0 30	0 20
ARC	0 40	0 45	0 40	0 35	0 45	1 0	0 30	0 25	0 35	0 25
SM	0 60	0 60	0 50	0 70	0 45	0 30	1 0	0 65	0 58	0 35
AI	0 40	0 45	0 40	0 60	0 25	0 25	0 65	1 0	0 50	0 30
EI	0 45	0 50	0 45	0 50	0 30	0 35	0 58	0 50	1 0	0 50
RI	0 25	0 30	0 25	0 30	0 20	0 25	0 35	0 30	0 50	1 0

This standard table of intercorrelations was developed from five large samples of enlisted men available by 1951 (Numbers in the samples ranged from 500 to 3 561) All values are rounded to the nearest 0 05 except for two high coefficients where rounding off in either direction would distort the results<sup>2</sup>

In this article only the first five tests (RV, AR, PA, MA, ACS) of the ACB are considered There are a number of reasons for so doing (1) Time limitations It takes a little more than two and one half hours to administer just the first five tests (2) The first five tests are aptitude measures, whereas the last five are much more measures of achievement or skill (3) The scores for the last five tests are sometimes missing from Form 20

Table 2 presents some preliminary test retest data for two control groups on the first five tests of the ACB Samples were drawn from Ft Meade, Md, and from the patient detachment at Walter Reed Army Hospital

The Ft Meade sample consisted of all the enlisted men available for testing in a medical training unit The age ranged from 18 to 44, years of education, from 6 to 20, The rank, from private to master sergeant The test retest time ranged from 20 weeks to 403 weeks

The Walter Reed Army Hospital controls were a sample of enlisted patients from which all psychiatric patients and patients having a diagnosis of brain damage were excluded Years of education ranged from 5 to 18, rank, from private to master sergeant, and age, from 18 to 41 years The distribution of elapsed time between test and retest was similar to that of the Ft Meade sample, being 30 to 390 weeks In table 2, the retest mean,  $\bar{X}_2$ , for both control groups is slightly higher than the original mean,  $\bar{X}_1$   $\bar{D}$  is the average increase from  $\bar{X}_1$  to  $\bar{X}_2$  There is a minimum increase of about 1 point, apparently due to

schematic diagrams There are 40 items, the time limit is 15 minutes

Inasmuch as the AGCT is no longer in use it will not be discussed here

### Armed Forces Qualification Test (AFQT)

The correlation between the equivalent Forms 1 and 2 when taken on the same day is about 0.90. The correlation between Forms 3 and 4 is 0.93. Forms 1 and 2 correlated with Forms 3 and 4 about 0.85.

The great advantage of the AFQT is that all members of the armed services take it. However it is rather difficult to use the AFQT for the assessment of premorbid intelligence since it is not easy to obtain the AFQT score for many enlisted men. These scores are not regularly entered on Form 20 (Form 20 will always be found in the Record Jacket). Instead they are entered on DD Form 47 for inductees and DD Form 4 for enlistees. Since April 1956 these forms have been placed in the Record Jacket. Prior to April 1956 there was no requirement that the AFQT score be included in the Record Jacket. One copy of Form 47 is sent to the Surgeon General Department of the Army Washington 25 D C, ATTN MEDCS. It is held there for about a year and then stored in Alexandria Va (Unfortunately Form 47 is filed by place and date of induction rather than alphabetically or by Army Serial Number).

There are other difficulties in using the AFQT. It cannot be readministered to an enlisted man without permission from the Adjutant General. No test retest studies have been made where the time interval between test and retest was longer than a few days. Only a single score is available; there is no way to measure differential deficit. For these reasons and others we have turned to the ACB as a means of assessing mental deficit due to illness.

### Army Classification Battery (ACB)

The ACB when properly weighted usually can predict performance at various Army Schools (Radio Mechanics et cetera) with an average validity of about 0.6. Correlations with actual performance in the field run somewhat lower. The ACB inter correlations are given in table 1.

Frequently the clinical psychologist or medical officer is asked whether the patient's abilities are so impaired that he cannot be returned to his former duty. Theoretically the ACB scores made by a patient following illness could be used to help determine whether the patient could be returned to duty.

If the data in table 2 were truly representative of the Army population, how could they be used to assess the mental deficit due to brain injury or mental illness? How much must an ACB score drop (assuming adequate motivation) before there can be good evidence of mental deficit?

Let us assume that we have an ACB test where the mean of  $\lambda_1$  is 100, the mean of  $\lambda_2$  is 101, the standard deviations are each 20, and the test retest correlation is 0.70. Maximum sensitivity can be obtained by using the usual prediction equation

$$\hat{\lambda}_2 = a + b\lambda_1$$

where  $\hat{\lambda}_2$  is the predicted retest score,

$\lambda_1$  is the first test score,

$$b = r_{12} \frac{\sigma_2}{\sigma_1},$$

and  $n = \bar{\lambda}_2 - b\bar{\lambda}_1$

In this case,  $\hat{\lambda}_2 = 31 + 0.7\lambda_1$ . The error of prediction,  $\lambda_{2,1}$ , will equal  $\lambda_2 - \hat{\lambda}_2 = \lambda_2 - 31 - 0.7\lambda_1$ . The standard deviation of the error of prediction is  $\sigma_2 \sqrt{1 - r_{12}^2}$  which here equals about 14. If  $\lambda_{2,1}$  is negative, this suggests mental deficit. The significance of  $\lambda_{2,1}$  can be assessed by dividing it by its standard deviation. That is, the standard score

$$z = \frac{\lambda_{2,1}}{\sigma_{2,1}} = \frac{\lambda_2 - n - b\lambda_1}{\sigma_2 \sqrt{1 - r_{12}^2}} = \frac{\lambda_2 - 31 - 0.7\lambda_1}{14}$$

Since our interest is confined to mental deficit, a one-tailed test should be used. Then a  $z$  of 1.645 is necessary for the judgment of mental deficit to be significant at the 5 per cent confidence level. In our example, this means that  $\lambda_{2,1}$  would have to be about -23. (The difference  $\lambda_2 - \lambda_1$  can be used to assess mental deficit, but it is not as sensitive as the error of prediction.)

The data presented here are tentative. Before such a procedure can be used with confidence, it will be necessary to expand the sample of test-retest data considerably. It is not clear, for example, how the test-retest correlation varies as a function of time between test and retest. If there is systematic variation, it will be necessary to obtain samples stratified with respect to (1) age at time of first test, and (2) time between test and retest.

It is usually easy to obtain ACB test scores of enlisted men because the scores are recorded on Form 20 panes the enlisted man throughout his career, the retesting of Army enlisted



practice effect and the learning that occurs in an Army environment

TABLE 2 Test retest data on the Army Classification Battery

Test	$\bar{X}_1$	$\bar{X}_2$	$s_1^2$	$s_2^2$	$r_{12}$	$\bar{D}$	$s_d$
<i>Ft. Meade Medical Detachment N = 54</i>							
RV	93	98	504	425	0.80	5	14
AR	89	91	488	596	0.84	2	13
PA	94	98	449	448	0.70	4	16
MA	94	99	336	356	0.81	5	11
ACS	86	88	385	320	0.76	2	13
<i>Walter Reed Hospital Controls N = 47</i>							
RV	99	100	348	426	0.69	1	15
AR	96	97	377	409	0.75	1	14
PA	97	101	539	398	0.66	4	18
MA	100	103	290	327	0.78	3	12
ACS	86	90	364	361	0.70	4	15

Theoretically the variance ( $s^2$ ) of each test should equal 400 since the hypothetical standard deviation is 20. The observed range is from a variance of 290 ( $s = 17$ ) to a variance of 596 ( $s = 25$ ). This seems to be within the variation expected from random sampling. The median test retest correlation is about 0.75 with the hospital sample having somewhat lower correlations than the Ft. Meade group.

One question often raised is whether ACB scores are reliable enough to be worth using. Apparently, in some cases the ACB is administered to subjects who have been subjected to a fair amount of stress, sleep loss, hunger, fatigue, et cetera. However, the median test retest correlation of 0.75 over a period of several years is about as good as can be expected of any group mental test.

There is good internal evidence that, whatever the initial testing conditions may have been, the error variance was not seriously increased. The retest,  $\bar{X}_2$ , was administered to subjects who so far as we know, were not suffering from hunger, sleep loss, fatigue, et cetera. If  $\bar{X}_1$  were full of errors due to stress, then  $s_1^2$  should be much greater than  $s_2^2$ . Inspection of table 2 shows no such consistent difference. As a matter of fact there is little evidence in the literature that sleep deprivation or fatigue (in the amount usually encountered) have much influence on intelligence test scores.<sup>5</sup>

difficulties. The only individuals authorized by Army Regulations to administer the ACB are the Classification Officers stationed on each post. While it is possible to request the Classification Officer to perform the retesting, this would impose an additional workload not anticipated in usual Army situations.

We were granted permission by The Adjutant General to use the ACB for research purposes, provided the usual security precautions were maintained. Presumably, it would be possible for commissioned clinical psychologists (MOS 2232) to request special permission from The Adjutant General. It is also possible that an equivalent form of the ACB could be prepared in co-operation with the Personnel Research Branch (Office of the Adjutant General) for the special use of clinical psychologists.

#### COMPARISON OF ACB WITH WECHSLER BELLEVUE (W B, FORM 1)

One of us (E. H. M.) administered the W B, Form 1, to 100 recruits, ages 20 to 24, at the Ft. Sam Houston Reception Center. Table 3 gives the correlations that were obtained between the W-B and the first three tests of the ACB. From table 3 it can be seen that RV, AR, and PA can be predicted with a validity of about 0.50.

For the convenience of those individuals who are more accustomed to the usual clinical I Q tests than to the Army standard scores and percentiles, approximate equivalence levels have been given in table 4. Table 4 is not based on a sample of subjects who have taken all five tests. It has been deduced from the standardization data available on each test. It is impossible, on the basis of the standardization data, to make any exact transformation of the clinical I Q's into the Army standard scores and percentiles. For this reason, table 4 is not a reliable basis for assessing mental deficit.

If there were data on the correlations between the ACB and the W B where a year or more elapsed before the W B was given, then the same error of prediction technic described previously for the ACB could be used to assess mental deficit. In order to use the W B in the same way as we recommended for the retest ACB, it would be necessary to have large samples stratified by age at time of ACB test and by time interval between ACB and W B.

We are continuing to gather ACB retest data on patients and controls. It is hoped that enough data can be gathered so that adequate norms can be published for the use of the Army Medical Service.

**ACKNOWLEDGMENT** Our thanks are due to Dr. John P. Mundy of the Personnel Research Branch for the use of these data.

TABLE 3 Intercorrelations of Wechsler Bellevue and Army Classification Battery

	ACB Correlations			Mean	s
	RV	AR	PA		
WB verbal weighted	81	79	60	42.21	12.70
WB performance weighted	60	64	64	49.19	13.01
WB total weighted	77	78	81	91.40	23.46
WB total weighted	76	71	63	8.43	3.07
WB informat on	58	56	37	9.50	2.84
WB comprehension	50	49	33	7.19	3.12
WB digit span	63	70	51	8.47	4.41
WB arithmetic	65	60	48	8.96	2.90
WB similarities	76	70	55	8.05	2.72
WB vocabulary	52	56	55	9.77	3.34
WB picture arrangement	51	54	54	9.42	3.60
WB picture completion	50	56	58	10.45	3.08
WB block design	35	39	48	10.66	2.94
WB object assembly	54	51	42	8.73	3.06
WB digit symbol	1.00	82	63	92.63	21.69
Army RV	82	1.00	73	89.80	22.02
Army AR	63	73	1.00	92.18	20.81
Army PA					

De mal omitted before c r r lat ons  
WB = Wechsler Bellevue

TABLE 4 Approximate intelligence level equivalents

Category	Terman Merrill	Wechsler Bellevue I Q	Percentile score AFQT	AGCT and ACB score	Army mental grade
Defective	69 and under	65 and under	0-9	0-73	V
Borderline	70-79	66-79	10-30	74-89	IV
Dull	80-89	80-91	31-64	90-107	III
Normal	90-109	92-115	65-92	108-129	II
Bright	110-119	116-126	93 and above	130 and above	I
Superior	120 and above	127 and above			

June 1957)

## ASSESSMENT OF INTELLECTUAL DEFICIT

891

difficulties The only individuals authorized by Army Regulations to administer the ACB are the Classification Officers stationed on each post While it is possible to request the Classification Officer to perform the retesting, this would impose an additional workload not anticipated in usual Army situations

We were granted permission by The Adjutant General to use the ACB for research purposes, provided the usual security precautions were maintained Presumably, it would be possible for commissioned clinical psychologists (MOS 2232) to request special permission from The Adjutant General It is also possible that an equivalent form of the ACB could be prepared in co-operation with the Personnel Research Branch (Office of the Adjutant General) for the special use of clinical psychologists

### COMPARISON OF ACB WITH WECHSLER BELLEVUE (W B FORM 1)

One of us (E H M) administered the W B, Form 1, to 100 recruits, ages 20 to 24, at the Ft Sam Houston Reception Center Table 3 gives the correlations that were obtained between the W-B and the first three tests of the ACB From table 3 it can be seen that RV, AR, and PA can be predicted with a validity of about 0.80

For the convenience of those individuals who are more accustomed to the usual clinical I Q tests than to the Army standard scores and percentiles, approximate equivalence levels have been given in table 4 Table 4 is *not* based on a sample of subjects who have taken all five tests It has been deduced from the standardization data available on each test It is impossible, on the basis of the standardization data, to make any exact transformation of the clinical I Q's into the Army standard scores and percentiles For this reason, table 4 is not a reliable basis for assessing mental deficit

If there were data on the correlations between the ACB and the W B where a year or more elapsed before the W B was given, then the same error of prediction technique described previously for the ACB could be used to assess mental deficit In order to use the W B in the same way as we recommended for the retest ACB, it would be necessary to have large samples stratified by age at time of ACB test and by time interval between ACB and W B

We are continuing to gather ACB retest data on patients and controls It is hoped that enough data can be gathered so that adequate norms can be published for the use of the Army Medical Service

ACKNOWLEDGMENT Our thanks are due to Dr Hubert E Brogden and Dr John P Mundy of the Personnel Research Branch TAGO who helped assemble some of these data

## REFERENCES

- 1 PRB Tech R s N te 24 Factorial composition of Army and Air Force Classification Batteries Mar 1954
- 2 PRB Report 976 Development of Armed Forces Qualification Test and Predecessor Army Screening Tests, 1946-1950 N v 1952
- 3 PRB Report 1078 Development of the Armed Forces Qualification Test, Forms 3 and 4, Oct 1953.
- 4 PRB R p n 996 Procedural Problems in Validating the Army Classification Battery Dec 1952
- 5 Tufts College Institute for Applied Experimental Psychology Handbook of Human Engineering Data D c 1949

## WHAT PRICE FOR TRANQUILITY?

The effects of tranquilizing drugs have been studied in 8 200 patients in whom anxiety was the normal chief finding. The group was limited to people of normal physical make-up and of at least average intellectual capacity who were capable of working steadily and were complaining of tension worry and associated physiological disturbances. Of these 7 500 had taken some amount of the tranquilizing drugs before they came under observation. The danger to the patient's physical health is shown by the appearance of allergic phenomena in 96 general toxic effects in 78 habituation in 72 severe liver disturbances in 31 other severe symptoms in 97 and death in 4. Two of the deaths were suicides. The danger to the patient's emotional health is shown by the finding of about 1 700 instances in which serious problems were created in essentially normal people and 827 instances in which emotional illness was aggravated. The danger to the physician results from accumulating pressure on the medical profession from the people who produce and those who demand these drugs. There is fourthly a grave danger to society in the idea that tensions should be reduced by techniques of relaxation and administration of drugs rather than by the constructive effort required for satisfying needs and removing dangers. The physician must inform himself well about these drugs and reorient his own thinking about their indications and limitations.

—HERMAN A DICKEL M D  
HENRY H DIXON M D  
in *Journal of the American Medical Association*, p 422 Feb 9 1957

Assigned to the installation having primary responsibility for the dental care of antiaircraft artillery personnel in each of the major defense areas in the Second Army, it is planned to have the units visit each site on a regularly scheduled itinerary. Visits of 10 days to 2 week duration will enable the dental surgeon to conduct a dental survey at the site and apportion his time and efforts accordingly. Cases requiring extensive or complicated treatment beyond the capabilities of the mobile facility will be referred to a fixed installation for such care. Depending on the number of sites to be served in a particular area, the results of dental surveys, and other factors, it is estimated that return visits can be made on an average of every 3 or 4 months.

The availability of these mobile clinics satisfies a long standing need and enables the Army Dental Corps to better fulfill its role and mission as a part of the Army Medical Service.

---

### THOROUGHNESS

"No quality in the practicing physician is more important than thoroughness. With it a clear mind can become great; a mediocre one expert. Without thoroughness inexcusable errors are certain to occur during the professional lifetime of a doctor. Painstaking thoroughness in the daily routine of work is a distinguishing characteristic of the scientist. It is a habit of mind difficult for some to acquire, easy for others—absolutely essential for the successful care of medical patients."

—EDITORIAL  
in *GP*

p. 70 Sept. 1956

are being furnished other Continental United States (CONUS) Armies as follows First Army 2, Fifth Army 2 and Sixth Army 3

Officially listed as Dental Operating Clinic Semitrailer Mounted Two Chair these vans have been developed to provide service and facilities comparable to that of fixed installations (fig 2) As the name implies these 30 foot vans are completely equipped with standard dental chairs units cabinets and all accessory items so that two dental officers or an officer and a dental hygienist can be simultaneously employed Other features include dental roentgenographic equipment a combination laboratory and dark room and airconditioning Although self contained the vans are equipped with utility outlets including telephone in order that they may operate either independently or from outside electrical and water supply sources

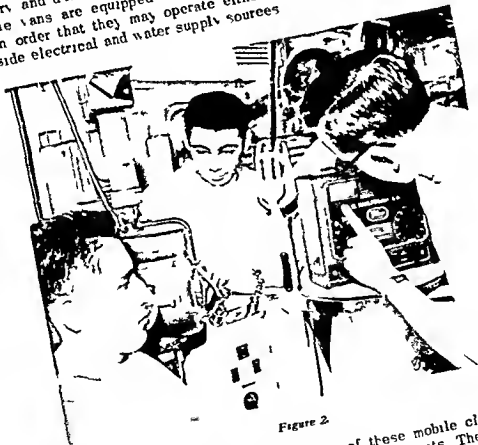


Figure 2

As previously stated the mission of these mobile clinics is to provide on site service to remotely located units The heretofore widely dispersed location of most NIKF missile sites has required personnel to travel great distances and be absent from their place of duty for prolonged periods in order to obtain dental care at a fixed facility

Assigned to the installation having primary responsibility for the dental care of antimircraft artillery personnel in certain major defense areas in the Second Army, it is planned that the units visit each site on a regularly scheduled itinerary of 10 days to 2 week duration will enable the dental unit to conduct a dental survey at the site and apportion his time efforts accordingly. Cases requiring extensive or complicated treatment beyond the capabilities of the mobile facility will be referred to a fixed installation for such care. Depending on number of sites to be served in a particular area, the frequency of dental surveys, and other factors, it is estimated that return visits can be made on an average of every 3 or 4 months.

The availability of these mobile clinics satisfies a long standing need and enables the Army Dental Corps to better fulfill its role and mission as a part of the Army Medical Service.

---

### THOROUGHNESS

"No quality in the practicing physician is more important than thoroughness. With it, a clear mind can become great, a mediocre one, expert. Without thoroughness inexcusable errors are certain to occur during the professional lifetime of a doctor. Painstaking thoroughness in the daily routine of work is a distinguishing characteristic of the scientist. It is a habit of mind difficult for some to acquire easy for others—absolutely essential for the successful care of medical patients."

—EDITORIAL

in *GP*

p 70 Sept 1956



are being furnished other Continental United States (CONUS) Armies as follows First Army 2 Fifth Army, 2, and Sixth Army, 3

Officially listed as Dental Operating Clinic Semitrailer Mount ed Two Chair, these vans have been developed to provide service and facilities comparable to that of fixed installations (fig 2) As the name implies these 30 foot vans are completely equipped with standard dental chairs units cabinets and all accessory items so that two dental officers or an officer and a dental hygienist can be simultaneously employed Other features include dental roentgenographic equipment a combination laboratory and dark room and airconditioning Although self contained the vans are equipped with utility outlets including telephone in order that they may operate either independently or from outside electrical and water supply sources

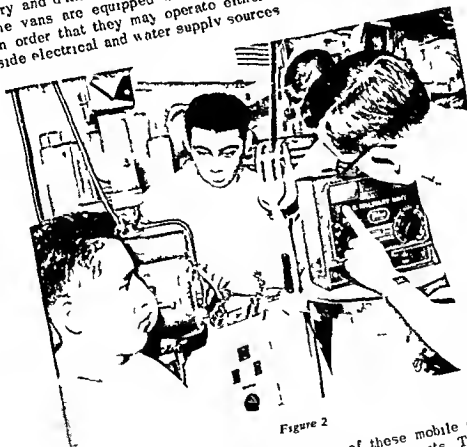


Figure 2

As previously stated the mission of these mobile clinics is to provide on site service to remotely located units The heretofore widely dispersed location of most Nike missile sites has required personnel to travel great distances and be absent from their place of duty for prolonged periods in order to obtain dental care at a fixed facility

June 1957)

# CASE REPORTS—TORSION APPENDIX TESTIS

597

the testis. An exception to this is the one case reported by Vermeulen and Hagerty<sup>1</sup> in which the patient, a 10 year old boy, was acutely ill and tenderness precluded careful palpation of the testis until after he was anesthetized, at which time a movable mass attached to the upper pole of the testis was palpable.

The treatment of choice is surgical excision of the twisted appendix. Seidel<sup>2</sup> reported one case which responded to conservative therapy, but it is generally concluded that surgery shortens the period of morbidity.

I have treated three patients diagnosed as having torsion of the appendix testis. Two were treated conservatively and the diagnosis was consequently confirmed by surgery in only one case.

## CASE REPORTS

Case 1. A 10 year-old boy was seen in the urology clinic at this hospital on 13 August 1956 with a history of having developed sudden pain in the right scrotum and inguinal region one week prior to this time. Since then the pain had been intermittent, aggravated by walking and apparently relieved by sitting or lying still. There were no systemic symptoms and his appetite was good. There had been no contact with mumps. Urinary symptoms were denied. There was no previous history of genitourinary complaints except that both testes tended to retract into the inguinal canal though they would descend to the scrotum when he sat in a warm tub.

Examination revealed an obese male in no apparent distress. Adduction of the right thigh was noted while walking but no discomfort was noted while sitting or lying still. Temperature was 99.4°F orally. Physical examination was negative except for marked edema and erythema of the right hemiscrotum, exquisite tenderness over the scrotum and right inguinal region and the presence of both testes at a level just below the external inguinal ring. Because of the tenderness neither testis could be pushed into the scrotum. The white blood cell count was 11,000 per  $\mu$ l with a differential count of 70 per cent neutrophils, 25 per cent lymphocytes, 1 per cent monocytes and 4 per cent eosinophils.

The patient was treated conservatively for one day with no appreciable diminution of symptoms and consequently surgical exploration of the right testis was performed with a preoperative diagnosis of torsion of the spermatic cord. The tunica vaginalis contained approximately 10 ml of clear yellow fluid. The testis and epididymis appeared normal but attached to the superior pole of the testis immediately anterior to the globus major of the epididymis was a red soft structure 1 cm in diameter. This was apparently twisted counterclockwise. The testis and tunica vaginalis were excised, the incision closed and the patient discharged from the hospital on

## CASE REPORTS

### TORSION OF THE APPENDIX TESTIS

HERBERT S. FRIEDMAN Captain USAF (MC)

THE most consistent vestigial organs found on the testes are the appendix testis and epididymis derived respectively from the cranial ends of the Mullerian duct and mesonephric collecting tubules. The frequency with which these structures occur are demonstrated by the findings of Sundarasivarao<sup>1</sup> who reported that on 152 testes examined 122 were found to have an appendix testis and 35 an appendix epididymis. Only 21 specimens had neither and only 6 subjects had neither vestige bilaterally.

The only pathologic condition affecting these structures primarily is torsion. This was described by Orhredanne<sup>2</sup> in 1913 and since then has been shown to be a not uncommon occurrence as evidenced by the number of reported cases appearing in the medical literature. Scott<sup>3</sup> collected 85 reported cases including one of his own in 1940. Seidel and Leav<sup>4</sup> found 14 other cases and added 6 of his own to bring the total to 107. Since then there have been numerous case reports appearing in the American medical literature.<sup>5-7</sup>

The cause of the torsion is unknown and the condition has occurred in undescended as well as in descended testes with no known increase in frequency in the former. It has been found in a 4<sup>1</sup>/<sub>2</sub> month old infant as well as in a 39-year old man. The age group of most common occurrence is 10 to 14 years. The ordinary clinical picture is acute onset of pain in one testis sometimes associated with a sudden movement. Swelling of the testis on the affected side along with edema and erythema of the overlying scrotal skin soon occurs. There are very few systemic symptoms and little if any fever. Palpation of the testis where this is permissible demonstrates a tender nodule either attached to or immediately anterior to the globus major of the epididymis. This may be differentiated from acute epididymitis by the acute onset absence of the testis. Torsion of the findings upon examination of the prostate and tenderness at the upper rather than the lower pole of the testis. Torsion of the spermatic cord may be differentiated from torsion of the appendix testis by the fact that in the latter the symptoms are less severe and there is a tender nodule at the upper pole of

From U. S. Air Force Hospital, Lowry Air Force Base, Colo.



day. When seen one week postoperatively the incision was well healed and no edema of the testis was present.

#### Pathologist's Report

The specimen submitted consisted of a rounded piece of tissue measuring 1 by 1 by 0.3 cm. The tissue was smooth and soft. The color varied from dark red to dark blue. Cut sections presented a smooth glistening dark red slightly bulging surface.

The sections showed a piece of loose connective tissue rich in blood vessels and lined by one layer of columnar ciliated epithelium.

The connective tissue was diffusely infiltrated by inflammatory cells predominantly polymorphonuclear like leukocytes. The blood vessels were distended. Areas of extravasated blood were present within the stroma. There were no epithelial inclusions in the stroma of the specimen. No thrombosed blood vessels and no areas of necrosis were present (figs 1 and 2).



Figure 1. Section through entire appendix testis showing severe congestion and hemorrhage in the loose connective tissue stroma. Epithelial cells surround the specimen. There are no epithelial cell inclusions in the stroma. (48-mm Microtesssar hematoxylin-eosin stain.)

Diagnosis: Appendix testis inflammation, acute hyperemia, hemorrhage.

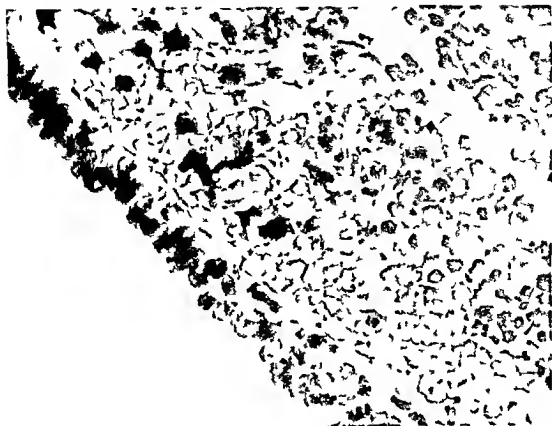


Figure 2 Epithelial lining consists of tall columnar ciliated cells ( $\times 675$  hematoxylin eosin stain)

**Case 2.** A 24 year-old man was admitted to the hospital on 29 May 1956 with the complaint of pain at the superior pole of the right testis for three days. He had previously been told that he had a small cyst on the upper pole of the right testis which had always been asymptomatic. The structure was now quite tender though no other abnormal physical findings were present. He was treated conservatively and discharged asymptomatic on 31 May.

**Case 3.** A 24 year-old airman was seen in the urology outpatient clinic with the complaint of pain in the right testis which had occurred suddenly two days before. The day following the onset of the pain he had taken several APC tablets which afforded no relief. There was no history of trauma, and no previous similar pains had occurred. He had no urinary symptoms or any systemic symptoms. Examination revealed mild tenderness of the right testis. The epididymis was normal. There was an exquisitely tender nodule about 1 cm in diameter attached to the superior pole of the right testis just anterior to the head of the epididymis. He was treated with ice packs and scrotal support and became asymptomatic in two days.

#### COMMENTS

The first of the patients presented was proved by surgical exploration to have torsion of the appendix testis. Though the preoperative diagnosis was torsion of the spermatic cord, the

day. When seen one  
healed and no edema o

#### Pathologist's Report

The specimen sub  
measuring 1 by 1 by  
color varied from de  
smooth glistening d

The sections show  
blood vessels and lit

The connective ti  
cells predominately  
vessels were disten  
within the stroma. T  
of the specimen. N  
necrosis were present

the muddiness of the  
was present for one  
was precluded  
remarkable response  
has been anticipated  
the other two cases  
was by the limitation  
both instances. The  
tial torsion of the  
spontaneously  
certainly adequate  
cal treatment. They  
andix testis may be  
ected. With this in  
excise any of these  
nive procedures on  
otomy or orchiopexy

# Pulmonary Amebiasis

## Combined Resection and Medical Therapy

MILAN L. BRANDON, *Lieutenant MC USA*

II LIONARD JONES, *Captain MC US*

HORACE D. WARDEN, *Captain MC USA*

AS a result of modern therapy the morbidity of amebiasis has been significantly decreased. There are many antibiotics for intestinal amebiasis, chloroquine phosphate, quinacrine hydrochloride, and emetine hydrochloride are useful for hepatic amebiasis, and antibiotics are particularly useful for secondary bacterial invasion. There is little indication, however, of significant progress in lowering the mortality rate of amebiasis.<sup>1</sup> The rapid strides in chemotherapy have tended to obscure the indications for surgery, especially in hepatic and pleuropulmonary amebiasis. Some cases are resistant to drug therapy and, in addition to simple drainage, there are other surgical procedures which are now available and applicable in certain instances.

The diagnosis of pulmonary amebiasis is frequently difficult or is often unsuspected.<sup>2</sup> Due to the increasing trend to resect suppurative pulmonary lesions, the diagnosis of amebiasis is established occasionally only after thoracotomy.<sup>3</sup> The following is a report of a case of pulmonary amebiasis, diagnosed at surgery and treated by pulmonary resection and drug therapy.

### CASE REPORT

A 36-year old Negro veteran was admitted to this hospital 26 October 1956 with complaints of cough and right posterolateral pleuritic chest pain of two months' duration. He had increased fatigability, anorexia and had lost 40 pounds. Initially the cough produced small amounts of clear mucoid sputum, but during the second month there were frequent paroxysms of cough which produced blood streaked sputum. He had felt feverish but had no chills. He had no gastro intestinal complaints.

Past history revealed that he had lived in Massachusetts, Louisiana and Georgia, had traveled throughout the world from 1943 through 1946. He was given antimalarial therapy in the Philippines in 1944. He had smoked from 10 to 15 cigarettes per day for 15 years. Family history and systemic review were noncontributory.



On examination the patient appeared emaciated and he coughed frequently. His blood pressure was 120/70 mm Hg pulse rate 100 per minute respiration 18 and temperature 100.4°F. There was an irregular enlargement of the right first costochondral junction. He had clubbing of the fingers. The right lung was dull to percussion at the base with diminished breath sound, and tactile fremitus but with no other definite signs of fluid. Medium to coarse moist inspiratory rales were present throughout the right lung. No abnormalities of the abdomen were noticed on examination.

Examination of the blood showed an initial hemoglobin of 10.7 grams per 100 ml hematocrit 35 ml per 100 ml white blood cell count 24,600 per  $\mu$ l with moderate shift to the left normal electrolytes negative sickle cell preparation and the serologic tests for syphilis were negative. Sulfobromophthalein sodium retention was 15 per cent in 45 minutes. His urine was normal. An initial sputum culture was positive for *Diplococcus pneumoniae* which was sensitive to the antibiotics being used in his treatment. Sputum smears and cultures and urine cultures for acid fast bacilli were negative. The tuberculin skin test was positive histoplasmin skin test was 4 plus positive and the coccidioidin skin test was negative.

On admission roentgenograms of the chest showed a density in the right apex and a rounded fairly homogenous soft tissue density without cavitation occupying the major part of the right lower lobe as well as pleural thickening and/or fluid in the anterior costophrenic sinus. Plain roentgenograms of the abdomen showed no abnormalities. Treatment was begun immediately with 250 mg oxytetracycline four times daily. Fever persisted at 100° to 101°F and penicillin and streptomycin sulfate were started on the 5th hospital day. Rales persisted at the right lung base and tenderness and fullness were noted at the right costal margin but the liver edge could not be palpated or percussed. Roentgenograms of the chest on the 7th day were unchanged. Fever subsided on the 10th day but only for a few days. Cough was nonproductive persistent and associated with pleuritic pain. Roentgenograms of the spine, ribs and skull showed no evidence of metastatic disease. Tomograms of the chest on the 12th day showed a large lymph node in the region of the bifurcation of the right main stem bronchus and a 9- by 8-cm soft tissue density in the right base with some constriction and irregularity of the right inferior bronchus. Bronchoscopy on the 14th day showed some injection of the mucosa of the right lower lobe bronchus with moderately thick mucoid secretions loaded with coccoid bacteria. Papanicolaou smear was negative. Complaints and findings persisted. Roentgenograms of the chest on the 25th day showed the density in the right base to have diminished slightly in extent and a faint circular area of radiolucency indicating either resolution of consolidation or possible cavitory change.

On the 26th day exploratory thoracotomy revealed acute and chronic inflammation in the right lower lobe including many old and recent pleural adhesions and a large thick walled abscess involving the

basilar segments of the right lower lobe which communicated in the shape of an hourglass through a 3 mm defect in the diaphragm with a 3 cm subphrenic abscess cavity containing purulent material. An old granulomatous infiltrate in the apical segment of the upper lobe was left intact. Resection of the right lower lobe basilar segments, and external drainage was accomplished. Before the patient left the operating room, histologic examination of a smear from the abscess wall stained with MIF (Merthiolate iodine formaldehyde)<sup>1</sup> revealed trophozoites of *Entamoeba histolytica* (fig. 1). Histologic examination of the abscess wall after formalin preparation showed necrotic lung tissue containing *E. histolytica* trophozoites. Cultures and smears for acid fast bacilli, fungi, and bacteria were all negative.



Figure 1 Smear from wall of lung abscess revealed trophozoites of *Entamoeba histolytica* and established the diagnosis of amebiasis (MIF stain)

Chloroquine phosphate (1.0 gram daily for 2 days, then 0.5 grams daily for 18 days) and emetine (0.06 gram daily for 6 days) were started without delay. Serial electrocardiograms taken while the patient was receiving emetine were all normal. Following the course of emetine, 0.21 gram of Diadoquin (brand of diodohydroxyquin) three times a day was given for 18 days. Chloroquine was restarted on the 45th day, 1 gram daily for 2 days, then 0.5 gram daily for 10 days. Oxytetracycline was discontinued and the drainage tubes were removed on the 33d day, or 1 week after surgery, when he was afebrile. Peni-

cillin and streptomycin sulfate were discontinued 3 weeks later. He remained afebrile and essentially asymptomatic. Roentgenograms of the chest showed some postoperative reaction in the right hemithorax which cleared gradually after removal of the drainage tubes.

Proctoscopy on the 55th day or 5th week postoperatively revealed hyperemia, petechiae and multiple small 2 to 3 mm ulcerations of the sigmoid colon and amebic cysts were identified on smear stained with MIF (fig 2). No abnormalities were seen on examination with a barium enema. A third chloroquine course was administered and 0.25 gram of carbarsone twice daily for 10 days was added. Small ulcerations of the sigmoid were still present but appeared to be granulating in well when the drugs were discontinued. Vioform (brand of iodochlor hydroxyquin) 250 mg three times daily for 14 days was then administered. Subsequent examinations and studies were normal and there was only residual scarring evident in the roentgenograms of the chest.

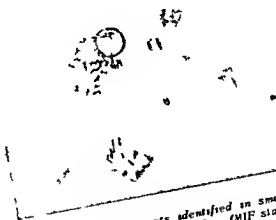


Figure 2 Amebic cysts identified in smear from ulceration of sigmoid colon. (MIF stain)

### DISCUSSION

Amebic pleuropulmonary involvement is secondary to amebiasis elsewhere and is generally the result of direct extension of hepatic amebiasis through the diaphragm into the lung, bronchus or pleura, resulting in lung abscess, bronchopleural fistula, or empyema. In a recent report of 148 fatal cases of amebiasis from the Armed Forces Institute of Pathology, amebic liver abscess was present in 61 per cent of the patients and 41 abscesses were ruptured.<sup>1</sup> Of the abscesses that ruptured 22 extended into the lung. In 18 patients with liver abscess there were no detectable intestinal lesions in 3 of these there was extension

June 1957)

# CASE REPORTS—PULMONARY AMEBIASIS

905

into the lung Amebiasis was correctly diagnosed ante mortem in only one third of all the cases, and liver abscesses were missed clinically in one half of 90 patients in whom the lesion was present

It, therefore, was not surprising to have met such diagnostic difficulties in our patient, the most disturbing of which were (1) initial positive cultures of *D. pneumoniae*, (2) roentgenographic evidence of right apical lung density, (3) positive reactions to tuberculin and histoplasmin skin tests, (4) lack of clinical or roentgenographic signs of right pleural effusion, (5) no evidence of cavitation in roentgenograms of the chest, and only the barest suspicion of this on tomograms, (6) lack of typical appearance of lesion and abscess contents at operation, and (7) absence of gastro intestinal complaints. Thus, it was important to consider an amebic origin in pleuropulmonary suppuration and to search immediately for amebias at thoracotomy, in order to institute prompt antiamebic therapy, without waiting for the processing of sections

In 1943, Ochsner and DeBakey<sup>4</sup> concluded that surgery offered little in the treatment of pleuropulmonary amebiasis, because the mortality of open drainage alone was 46.2 per cent, of open drainage plus emetine, 16.6 per cent, and with emetine alone it was only 5.4 per cent in their series. Advances in chemotherapy and improvement in surgical technic have made operative procedures other than simple external drainage practical and applicable in certain instances. Shaw<sup>5</sup> reported a case of chronic amebic pleuritis and pneumonitis in a patient whom he operated upon electively because of lack of response of the infection to antiamebic drugs and thoracenteses. He stated that when pleuropulmonary complications of amebic hepatic abscess do occur, surgical intervention may be necessary to (1) eliminate a persistent fistulous channel between the bile duct system and bronchus, (2) remove damaged pulmonary tissue that produces a continued moribund state, and (3) decorticate the lung and diaphragm in empyema when the lung cannot be re-expanded by repeated aspirations

In suspected pleuropulmonary complications of amebic hepatic abscess, Ochsner and DeBakey<sup>4</sup> pointed out that the prognosis is not as good in those with a small or absent communication between a bronchus and an area of marked lung reaction as in those with a large communication which permits rapid evacuation. When there is no communication with a bronchus the cough will tend to be nonproductive and amebas will be absent in the sputum. The diagnosis will be difficult to establish and the course will simulate a primary bacterial or fungus infection, or a malignant neoplasm with secondary infection. In such a case the diagnosis may be established only at thoracotomy, as in our patient. It

is the third patient in whom pulmonary amebiasis was successfully treated by pulmonary resection combined with antibiotics, chloroquine, and emetine. It is noteworthy that no failures with such combined treatment have been reported in the available literature. It would therefore, appear that this type of surgical procedure together with vigorous antamebic drug therapy might reasonably be expected to improve the prognosis of advanced pulmonary amebiasis.

### SUMMARY

An unusual case of amebic lung abscess is reported, which (1) presented exceptionally difficult diagnostic features and (2) was treated successfully with segmental resection combined with emetine, three courses of chloroquine and other amebicides, as well as antibiotics. This is the third reported case of a patient with pulmonary amebiasis treated in this manner. By removing the products of infection as completely as possible, it is our belief that this form of surgical intervention combined with vigorous multiple drug therapy will further lower morbidity and mortality in advanced pulmonary amebiasis.

### REFERENCES

- 1 Kean B H, Gilmore H R Jr, Van Stone W W. Fatal amebiasis: report of 148 fatal cases from Armed Forces Institute of Pathology. *Ann. Int. Med.* 44: 831-843 May 1956.
- 2 Shaw R R. Thoracic complications of amebiasis. *Surg. Gynec. & Obst.* 88: 753-762 June 1949.
- 3 Sapero J J and L. wless D K. NIF stain preservation technique for identification of intestinal protozoa. *Am. J. Trop. Med.* 2: 613-619 July 1953.
- 4 Ochsner A. and DeBakey M. Amebic hepatitis and hepatic abscess: analysis of 181 cases with review of literature. *Surgery* 13: 460-493 Mar. 612-649 Apr. 1943.
- 5 Ochsner A. and DeBakey M. Pleuropulmonary complications of amebiasis: analysis of 153 collected and 15 personal cases. *J. Thoracic Surg.* 3: 225-238 Feb. 1936.

## Fracture Following Corticotropin Therapy

WALLIS L. CRADDOCK Lieutenant Colonel MC USAR

ALL of the many available preparations of corticosteroids and corticotropin (ACTH) are capable of causing complications involving bone. Apparently none is safer than the others. The first report of pathologic changes in bone following the use of these drugs was in 1950.<sup>1</sup> In the two cases described, osteoporosis of rheumatoid arthritis was a contributory factor in producing fractures. In one of these cases, a 70 year old woman suffered fracture of the right femoral neck with pronounced displacement after 34 days of cortisone therapy. Extreme osteoporosis at the fracture site was noted when open surgical reduction was attempted.

Demnrtini, Grokoest, and Rngnn<sup>2</sup> in 1952 reported a series of five patients with rheumatoid arthritis, all of whom were predisposed to osteoporosis prior to hormone treatment. Following therapy with cortisone they developed compression fractures of the lower dorsal and lumbar spines. These patients were female, four of them postmenopausal, and their physical activity was limited. Subsequent reports have indicated that intensive and prolonged use of the hormones is a prerequisite for osteoporotic changes, but that these changes are not a rare complication of such therapy.<sup>3,4,5</sup>

Osteoporosis with vertebral fractures is a clinical feature of Cushing's syndrome in over 80 per cent of cases.<sup>6,7</sup> Becks and associates<sup>8</sup> demonstrated that ACTH tends to retard endochondrogenesis and osteogenesis in normal rats, accounting for the irregular arrangement of bony trabeculae, as well as irregular cartilage columns in the erosion zones. Blunt and co-workers<sup>9,10</sup> studied the effect of cortisone on the responses of the connective tissues to trauma. The reparative process remained sluggish after the fourth postfracture day, with relatively little tissue differentiation, and there was only minimal healing between the ends of the fractured bone. The intercellular matrix appeared quite irregular in structure. Fibroblasts appeared abnormal with bizarre arrangements of nuclear chromatin.

From Outpatient Clinic Veterans Administration Regional Office 1750 S Redwood Rd Salt Lake City Utah

It was concluded that (1) the blood supply might be inadequate due to dearth of new blood vessels with insufficient nutrition of tissue or that (2) through the low now blood vessels which did penetrate the area, a material perhaps cortisone itself was transported which inhibited growth and development of connective tissue. At any rate, the primary disturbance is lack of bone matrix formation due to deficiency in protein metabolism. The osteoporosis produced by cortisone and ACTH therapy should not be confused with osteomalacia, where the primary disturbance is demineralization of bone or with parathyroid disease, where the disturbance is destruction of bone.

More recently, vertebral fractures after use of corticosteroids have been reported in younger males. One interesting report describes the occurrence of fractures of the spine in a 9 year old boy being treated for Still's disease.

To ensure earliest possible detection of osteoporosis, urinary calcium excretion studies should be performed serially on patients who are receiving corticosteroids and ACTH. A value above 150 mg per day points to a negative calcium balance. Such a calcium excretion may indicate loss of bone mass. Periodic roentgenograms of the spine also serve as guides in predicting vertebral fractures.

Post mortem findings in cases of hormone induced osteoporosis with pathologic fractures have been well documented. Although the osteoporotic changes have a predilection for the lumbodorsal spine and pelvic bones similar changes have been observed in the knee ankle, and subtalar joints. In addition to the marked bone deformity the overlying cartilage may deteriorate rapidly and prominent secondary hypertrophic changes may appear about the joint margins. Microscopic examination of the softened vertebrae reveals few bony trabeculae, no evidence of osteoid activity and little osteoblastic or osteoclastic activity. Fractures of ribs are repaired by large quantities of poorly ossified cartilage.

It has been suggested that continuous action of the depository type of ACTH (ACTH gel) is responsible for changes in bone, whereas when the drug is administered intermittently (intravenously) osteoporosis does not occur. The assumption has been made that with the older types of treatment the adrenal gland had some chance to recover its function between injections.

The bone damage caused by cortisone and ACTH appears to be irreversible despite the use of estrogens and testosterone. Once this condition appears only conservative measures of treatment are of any help. To forestall the development of aseptic necrosis or Charcot like changes in weight bearing joints "patients can be warned to avoid weight bearing as much as possible to use crutches and canes to support already damaged joints, and thus to extend the usefulness of joints."

Discontinuation of maintenance therapy presents difficulties, in that symptoms of cortisone withdrawal and an exacerbation of the underlying disease may occur.

The following case report illustrates the problem encountered during maintenance ACTH therapy even when none of the contributory conditions causing pathologic changes in bone are present prior to prolonged hormone therapy.

### CASF REPORT

A 43 year old white male veteran had been treated for neurodermatitis since 1945 otherwise he was in excellent health. All attempts to control this patient's condition failed until October 1952 when startling improvement occurred three to four days after intravenous infusions of ACTH were begun. Since 1953 (for over three years) he had been taking ACTH gel. He had always been able to get the drug despite frequent warnings of possible complications. There were transient features resembling a Cushing syndrome at times but these cleared rapidly when ACTH was discontinued for a short time. It was impossible to determine the total amount of corticotropin the patient had taken during the period of four years. Whenever he was hospitalized and the drug withdrawn reactions resembling those described as the "cortisone withdrawal syndrome" were noted.

During hospitalization in August 1954 roentgenograms of the spine and pelvis showed no abnormalities. He avoided further hospitalization until April 1956 because physicians were reluctant to continue the ACTH. Physical findings were within normal limits, despite the fact that the patient used crutches. His urine, blood urea nitrogen, serum calcium and phosphorus, serum proteins, fasting blood glucose, serum alkaline and acid phosphatase, carbon dioxide combining power of the blood and various serum electrolytes were normal. Roentgenograms of the skull and chest showed normal findings. Roentgenograms of the lower spine and pelvis revealed marked osteoporosis, slightly misshapen femoral heads and greatly thickened femoral necks indicative of possible aseptic necrosis of the heads of the femurs.

Following the hospitalization he received ACTH gel from various physicians prior to reporting to the outpatient clinic of this facility in September 1956. There were no significant changes in his physical status since his last hospitalization although his height is about 2 inches less than that recorded several years ago. He now shows no definite changes indicative of Cushing's syndrome. He uses crutches constantly but appears to be in no great pain. In fact he is usually quite jovial at times rather euphoric, steadily praising the benefits he receives from ACTH and meprobamate (Equanil). He is rather caustic in his expressions regarding physicians who would discontinue the ACTH gel.

Recent roentgenograms of the chest and skull showed no abnormalities. There were pronounced compression changes of the weight



bearing aspect of each femoral head with a lateral concave depression on each side to accommodate the outer lip of the acetabulum. These changes suggested absorption and marked softening of the bone (fig 1). Definite osteoporotic changes were seen in the head of the left humerus and shafts of both femurs, tibias and fibulas (fig 2). There was considerable compression and anterior spreading of the fifth lumbar vertebral body (fig 3).



Figure 1 Roentgenograms of pelvis showing pronounced compression changes of the head of each femur with concave depression laterally on each side to accommodate the outer lip of the acetabulum. (A) Right side (B) Left side

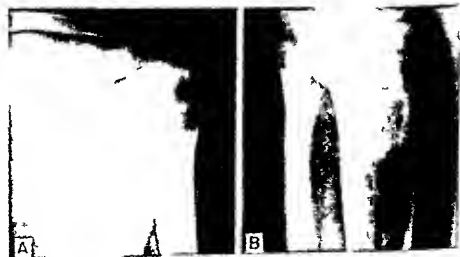


Figure 2 Osteoporosis of long bones due to ACTH gel (A) Left humerus. (B) Shafts of tibia and fibula right



Figure 3 Vertebral fracture from corticotropin therapy. Considerable compression and anterior spreading of the 5th lumbar vertebral body is shown.

Blood chemical and other laboratory tests have remained in normal ranges except for a persistently increased urinary excretion of calcium.

#### SUMMARY AND CONCLUSIONS

Because of the potential dangerous side effects of ACTH and the adrenocorticosteroids the decision to use or not to use any of these agents must be made for each patient. The effects of newer drugs are often deprecated, but it would appear that these hormones are but never forms of symptomatic therapy in many disease states. The physician must weigh any possible benefits of the drugs against the serious bone complications being reported at an alarming rate.

Postmenopausal women should probably not be given the hormones even if roentgenograms of their vertebrae show little evidence of osteoporosis. Serial determinations of urinary calcium excretion and periodic roentgenograms of the spine are indicated if the drugs are to be used over six months. If the hip has been affected, a roentgenographic appearance suggesting aseptic necrosis or Charcot like deterioration of weight-bearing joints may be observed. The most likely cause of this complication

is the greatly increased use to which patients submit joints already damaged by rheumatoid arthritis. Although massive degenerative changes usually occur in weight bearing joints they may be quite generalized.

In most of the reported cases of severe osteoporosis caused by these hormones the well known predisposing factors of advanced age, menopause and restriction of activity were present. The drugs were given for rheumatoid arthritis in most cases. Those showing femoral fractures, osteoporosis was demonstrated in pretreatment roentgenograms, and these occurred in postmenopausal women. However, the case reported vividly documents the severe complications from prolonged hormone therapy in a 43 year old man who was in good physical health prior to maintenance therapy with ACTH gel. The case illustrates the dilemma physicians must face in this ever growing problem, and that the hormones must not be given indiscriminately.

## REFERENCES

1. Bland E. W. and H. Wiley E. Management of rheumatoid arthritis with small (m. intensac) doses of cortisone acetate. *J. A. M. A.* 144: 365-372 Sept 30 1950.
2. Demartini F. Grokoe A. W. and Ragan C. Pathological fractures in patients with rheumatoid arthritis treated with cortisone. *J. A. M. A.* 149: 750-752 June 21 1952.
3. Soffer L. J. and B. D. R. Corticotropin and cortisone in acute disseminated lupus erythematosus: results of long term use. *J. A. M. A.* 149: 1002-1008 July 12 1952.
4. Tischer R. and Nelson C. T. Osteoporosis and pathological fractures following treatment with ACTH and cortisone. *J. Invest. Dermatol.* 19: 205-210 Sept 1952.
5. Eisenstadt W. S. and Cohen E. B. Osteoporosis and compression fractures from prolonged cortisone and corticotropin therapy. *Ann. Allergy* 13: 252-256 May-June 1955.
6. Reinhardt E. C. Jr. and Albright F. Metabolic effects of steroid hormone on osteoporosis. *J. Clin. Investigation* 27: 24-36, Jan. 1947.
7. Reinhardt E. C. Jr. and Thompson K. W. Brief communication: effects of adrenocortical pituitary basophilic stimulation on osteoporosis. *Yale J. Biol. Med.* 11: 507-522 May 1953.
8. B. B. C. H. Samps M. E. Li C. H. and Evans H. M. Effect of adrenocorticotropin hormone (ACTH) on osteoporosis in normal rats. *Endocrinology* 34: 305-310 May 1944.
9. B. B. C. H. and others. Antagonism of pituitary adrenocorticotropin hormone (ACTH) to action of growth hormone in osteoporosis of hypophysectomized rats. *Endocrinology* 34: 311-316, May 1944.
10. Blunt J. W. Jr. Plotz C. M. Lattes R. H. W. E. L. Myer K. and Ragan C. Effect of cortisone on experimental fracture. *Proc. Soc. Exper. Biol. Med.* 73: 678-681 Apr 1950.
11. Curtiss P. H. Jr. Clark W. S. and H. R. C. H. Vertebral fracture resulting from prolonged cortisone and corticotropin therapy. *J. A. M. A.* 156: 467-469 Oct 2 1954.
12. Irwin J. W. H. and P. H. Wang D. M. A. and Burrage W. S. Maintenance of intracortical bone density in preliminary study of maintenance of bone density. *J. Allergy* 25: 201-209 May 1954.
13. Editorial. Aspirin and cortisone. *J. A. M. A.* 162: 898 Oct 27 1956.
14. Frazer C. D. Discussion. *Ca* 39: 221 (Case Report of the Massachusetts General Hospital section). *New England J. Med.* 248: 945-950 May 28 1953.

# Acute Puerperal Inversion of the Uterus

JACK E. BYRD *Lieutenant Commander MC USN*  
WILLIAMS BAKER, Jr *Captain MC USN*

**A**CUTE puerperal inversion of the uterus was recognized as a distinct pathologic entity in the earliest medical writings.<sup>1-3</sup> The exact incidence is not known, but has been reported as 1 in 16,420 deliveries.<sup>4</sup>

The symptoms of acute inversion most often tabulated include shock, hemorrhage,<sup>5</sup> pain, and a mass in the vagina. Other signs or symptoms are fundal dimpling or cupping,<sup>6</sup> abdominal pain, retention or incontinence of urine, dysuria, or uremia.<sup>1, 7</sup> When shock occurs, it is more severe than in any other condition in obstetrics and is completely out of proportion to the amount of blood lost.<sup>4</sup>

Almost all possible causes have at some time or other been reported as a reason for puerperal inversion.<sup>8, 9</sup> The most frequently mentioned are mismanagement of the third stage of labor<sup>10, 11</sup> and conditions producing spontaneous inversion of the uterus.<sup>6, 12-16</sup> The advocated methods of management<sup>1, 7, 14-21</sup> are as diverse as are all other phases of this condition, but the majority of authorities favor immediate replacement of the inverted corpus.

## CASE REPORT

An 18 year old woman gravida 1 para 0 was admitted to this hospital on 11 January 1952. The fetal membranes had been ruptured for two hours. There were no contractions or bloody show on admission. The patient had been followed in the prenatal clinic for the last two months of her prenatal course which had been essentially normal. Her last menstrual period was 5 April 1951, and estimated date of confinement was 12 January 1952. Her total weight gain during this pregnancy was 14 pounds and she had no albuminuria or hypertension. Her hemoglobin on 26 January was 10.5 grams per 100 ml and blood type was A Rh positive. A serologic test for syphilis was negative, her urine was normal and roentgenograms of the chest showed no abnormalities.

---

From U S Naval Hospital Camp Lejeune N C. Both authors are now assigned to U S Naval Hospital San Diego Calif.



She was ambulatory on the morning of the third day and was discharged in good condition on the fifth postpartum day. There was no recurrence of bleeding or dimpling of the uterus during her hospital course.

The patient was well on 28 February when she was seen for a six weeks' postpartum examination. She had a slight erosion of the cervix. The fundus was well involuted, symmetrical, anterior and normal in size and configuration. She was seen on 10 April at which time a pelvic examination showed normal findings. She had had a normal menstrual period of four days beginning on 23 March.

The following day a hysterosalpingogram using Priodax (brand of iodoalphonic acid) as a radiopaque media showed a normal configuration of the uterine cavity and tubes with spillage into the peritoneum. There was a questionable loss of the normal uterine fundal concavity, which may indicate an inherent muscular defect in the fundus.

### DISCUSSION

As in all diseases and pathologic conditions, primary emphasis should be on prevention, when causative factors are known.<sup>24-26</sup> There is nothing mysterious about the cause of acute inversion of the puerperal uterus. The basic dynamics are simple. Any hollow elastic organ that is open at one end and is supported to some degree in one plane or another can be invaginated, ultimately to complete inversion, if a force of sufficient magnitude to overcome inertia and elastic resistance is applied at the proper time and in a proper direction. Whether or not the reduced elastic resistance in uterine inversion is atony, thinning at the placental site, or congenital malformation is of little importance, for the end result is the same. In the same respect, the force necessary to overcome this elastic resistance (whether it is increased intra-abdominal pressure, excessive downward pressure on the uterus in expressing the placenta, or excessive traction on the umbilical cord in completing the third stage) is important only insofar as the operator prevents such a force from being applied, or properly applies an opposing force should inversion occur spontaneously.

More women die from accidents during the third stage of labor than during the other two stages combined. At the conclusion of the second stage, if the child has been delivered slowly, the uterus will normally have contracted as the infant is removed. If delivery is too rapid or atony from any cause exists, there will remain a large balloonlike cavity and the predisposing condition for inversion is present, only awaiting the application of the necessary force to set the process in motion.

We believe that inspection of the vagina and cervix is a necessary routine and that exploration of the uterus should be done without hesitation if any undue bleeding or shock occurs. We do

not hesitate in any emergency to use type O, Rh negative blood which has not been cross matched, but has Witebsky's substances added. We do not consider that it is exercising undue caution to routinely start an infusion of 5 per cent dextrose in water in all cases of complicated labor or in which we anticipate trouble.

We firmly believe that immediate replacement of an acutely inverted uterus is essential and that many times this can be done prior to the onset of shock. Simultaneously, assistants should be administering supportive care. The uterus should be replaced gently but firmly, and the procedure should be a simple reversal of the inverting mechanism as described by Barrett. When the replacement has been completed, the hand in the uterus should be extended to the upper limits of the fundus and held there until an oxytocic substance can take effect. Any massage should be upward and at no time should the uterus be squeezed. As the uterine musculature responds to the oxytocic agent the operator should slowly withdraw his hand as it is forced from the uterine cavity. The patient should be closely observed in a continuous postpartum period and Pitocin administered in a constant intravenous drip using 10 units of the substance in 1 000 ml of 5 per cent dextrose in distilled water. The blood bank should have 1 500 ml of compatible whole blood available during the patient's hospital stay. A wide spectrum antibiotic should be given to the patient to prevent sepsis.

Using epinephrine and deep anesthesia to aid relaxation we would not hesitate to attempt reposition of the uterus even when a contraction ring is present. Manual removal of the placenta before or after reposition would depend on individual circumstances. If operative intervention were unavoidable we would first attempt the Spinelli vaginal approach. If this failed the Haultain abdominal method would be performed.

#### SUMMARY

Acute puerperal inversion of the uterus may be either spontaneous or caused by mismanagement of the third stage of labor. Predisposing factors include atony of the uterine muscle thinning at the placental site and congenital malformation. Particularly in the presence of such factors, any force such as increased intra abdominal pressure excessive downward pressure on the uterus in expressing the placenta or excessive traction on the umbilical cord may be sufficient to overcome the inertia and elastic resistance of the uterus and produce inversion.

Immediate gentle manual replacement of the uterus is essential in the treatment of this condition. The operator's hand should be maintained in the uterine cavity until an oxytocic substance can be given and take effect and until the hand is gradually forced from the cavity.

The case reported in this article demonstrates that prompt, adequate treatment may prevent serious complications in this emergency

## REFERENCES

- 1 Das P Inversion of uterus *J Obst & Gynaec Brit Emp* 47 525 548 Oct 1940
- 2 Dawson J B Acute inversion of uterus report of 4 cases (Obst Soc Sect) *New Zealand M J* 42 15 18 Oct 1943
- 3 de Vitry V *Union Med* p 550 1847 Cited in reference 2
- 4 Haret W B and Sharkey J A Acute inversion of puerperal uterus second of 21 cases *J A M A* 114 2289-2292 June 8 1940
- 5 Bell J E Jr Wilson G F and Wilson L A Puerperal inversion of uterus *Am J Obst & Gynec* 66 767 780 Oct 1953
- 6 Barrett C W Inversion of uterus *Illinois M J* 85 253 260 May 1944
- 7 Barrett C W Inversion of uterus attending physician a responsibility for immediate replacement *West J Surg* 53 146-152 May 1945
- 8 Davis G H Acute inversion of uterus with report of 4 cases *Am J Obst & Gynec* 26 249-254 Aug 1933
- 9 Nugent T E and MacKinnon M H Acute inversion of uterus *Canad. M. A. J* 52 381 383 Apr 1945
- 10 Salvin M Etiology of acute inversion of puerperal uterus classification based upon analysis of literature and animal observation with report of case *West J Surg* 50 147 155 Mar 1942
- 11 Quigley G J Inversion of puerperal uterus *Am J Obst & Gynec* 69 277 283 Feb 1955
- 12 Wadstein T Puerperal uterus inversion *Acta obst et gynec Scandinav* 17 24 35 1937
- 13 Thorn W Zur Inversion uteri *Sammel Klin. Vort* 1911 No 625 (Gynäk No 229) p 101
- 14 Brett P G Inversion of uterus following child birth *M J Australia* 1 254 256 Feb 3 1938
- 15 Clarkson I S Jr Inversion of uterus report of 3 cases *M. Rec & Ann* 39 1133 1136 Sept 1945
- 16 Torpin R Puerperal inversion of uterus *J M A Georgia* 36 63 70 Feb 1947
- 17 McLennan C E and McElvey J L Conservative treatment of inversion of uterus *J A M A* 120 679-682 Oct 31 1942
- 18 Spain A W Acute inversion of uterus *J Obst & Gynaec Brit Emp* 53 219 222 June 1946
- 19 Phaneuf L E Inversion of uterus *Am J Obst & Gynec* 11 171 180 Feb 1926
- 20 Cosgrove S A Management of acute puerperal inversion of uterus *Am J Obst Gynec* 38 912 925 Nov 1939
- 21 Urner J A Use of adrenalin in treatment of acute inversion of puerperal uterus with report of case *Am J Obst & Gynec* 25 131 133 Jan 1933
- 22 Daro A F Heskett B F and Schiller H A Epinephrine hydrochloride in acute puerperal inversion of uterus report of 3 cases *J A M A* 114 649 Feb 24 1940
- 23 O'Sullivan J V Acute inversion of uterus *Brit M J* 2 282 283 Nov 1945
- 24 Kaltreider D F and West G B Acute puerperal inversion of uterus with 2 cases seen at cesarean section *Bull School Med. Univ Maryland* 31 150 Apr 1947
- 25 Hawkins R J Exploration of uterus following delivery *Am J Obst & Gynec* 69 1094 1102 May 1955
- 26 Rueker M P Puerperal inversion of uterus. *South M. J* 32 1 02 Feb 1939



## Departments

### A MESSAGE FROM THE A M A

Last month's article outlined the comprehensive American Medical Association study project on medical professional liability. In particular it dealt with malpractice claims involving medical officers or federally employed physicians.

This month's Message concerns state legislative proposals as they pertain to medical professional liability. State laws are applicable in malpractice suits against civilian physicians while as pointed out in the preceding Message the Federal Tort Claims Act is applicable to claims involving military physicians. Although there have been isolated efforts to enact state legislation relating specifically to actions against physicians, relatively few laws have been enacted that would place physicians in a more vulnerable position than other tort defendants.

An unsuccessful proposal in Montana in 1971 for example would have made malpractice a felony. It is fortunate that the Montana proposal failed of enactment even though it did go on to provide that nothing therein should be construed to prohibit a physician or surgeon from administering medicine or otherwise treating patients in cases where the effect of the medicine or treatment might be dangerous to life or injurious but where the administration thereof is in accordance with sound approved medical practice. Undoubtedly many new practitioners would have been scared away from Montana if that legislation had been enacted. It would probably have caused physicians in Montana to hesitate a long time before using some of the newer drugs, treatments or techniques.

A Kansas law although relating only to patients in state hospitals who receive psychiatric shock treatments went to the opposite extreme by denying a cause of action against the physician unless he has been guilty of gross negligence.

Georgia law provides that a physician must bring to the exercise of his profession a reasonable degree of care and skill. It appears that this type of approach is best in the long run for both patient and physician. It doesn't require the physician to

June 1957)

# A MESSAGE FROM THE A M A

910

bo n miracle man, nor does it require the patient to establish a practically impossible degree of proof

There have been suggestions as to the need of "modernizing and reforming" the general law applicable to personal injury cases. For example, some states, through court decisions, have applied the doctrine of Comparative Negligence or the doctrine of Last Clear Chance. Usually, at common law, if the plaintiff of his own negligence contributes in any way to the injuries which he receives, he is denied a recovery from the defendant. This is the doctrine of Contributory Negligence and, if applicable and established, is a valid and complete defense in a negligence action. Many have contended that where the degree of contributory negligence is minute as compared with that of the defendant, a complete denial of recovery is neither fair nor reasonable. It has been further argued that where a defendant has the last opportunity to avoid an accident, even though there was some negligence on the plaintiff's part in placing himself in a hazardous position, the defendant should be held responsible for the resulting injuries. These arguments make considerable sense and have, in fact, resulted in the enactment of state laws establishing that point of view. One of the most recent of such laws was enacted in Massachusetts in 1954.

As to the question of burden of proof, it has been well established that as a general rule medical expert testimony is necessary to explain to a jury the standard of care required in a particular case, because logically a lay jury is held to be incapable of determining such a standard by itself. An unsuccessful proposal in Vermont would have changed that rule by providing that it would not be necessary in malpractice actions for the plaintiff to introduce expert testimony to establish a standard of care and skill for the purpose of showing the failure of defendant to observe such care. Another general rule of law provides that text books may not be admitted in evidence to establish the truth of statements found therein because of the fact that the author is not present and subject to cross examination. However, both Massachusetts and Nevada have enacted laws permitting the introduction of such evidence. The Massachusetts statute requires that, not less than three days before the trial, notice must be given the adverse party of such intention stating the name of the writer of the statement and the title of the treatise, periodical, book, or pamphlet in which it is contained.

Under the doctrine of *res ipsa loquitur* (the thing speaks for itself) it is not necessary to introduce expert testimony in those cases of accident or injury which clearly could not have happened unless someone was negligent. The mere showing of the

circumstances of the accident is sufficient to establish a prima facie case. Under such a presumption of fact the jury may infer that the accident or injury resulted as a consequence of negligence. An example would be where, following an operation a sponge was left in the patient's abdomen.

In some cases of malpractice where the plaintiff was unable to obtain medical witnesses the courts have gone too far in converting the doctrine of *res ipsa loquitur* into a rule of symmetry. It is entirely possible that should the courts believe there still remain valid and legitimate cases in which plaintiffs are unable to persuade reputable practitioners to testify in their behalf the state legislatures will be requested to solve the problem. Mayoe this attitude should serve as a warning to those members of the medical profession who are unobtainable as expert medical witnesses for the plaintiff.

## DEATHS

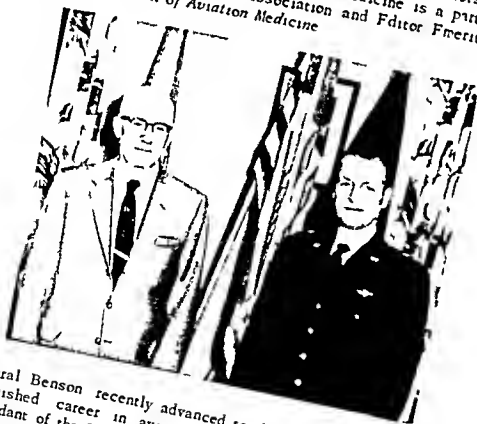
**BROWN** Dale Eugene First Lieutenant MSC USAR of Culver Ind stationed at 63d Medical Detachment Germany graduated in 1950 from Indiana University Bloomington Ind commissioned a Second Lieutenant in the United States Army Reserve 21 September 1951 died 4 April 1957 age 30 in Germany as result of a vehicle accident

**MADEROS** Luis Orlando Major MC USAR of Augusta Ga stationed at U S Army Hospital Fort Gordon Ga graduated in 1942 from the University of Havana Medical School Havana Cuba commissioned a Major in the U S Army Reserve 3 February 1956, died 15 March 1957 age 39 near Augusta Ga due to an automobile accident

**SULLIVAN** Meddie Charles Captain MSC USAR of Laurel Miss stationed at 28th Field Hospital Fort Bragg N C appointed a Flight Officer in the Army of the United States 10 November 1942 and a Second Lieutenant in the National Guard of the United States 6 January 1949 commissioned a First Lieutenant in the Army of the United States 11 June 1951 died 9 March 1957 age 35 at Fayetteville N C due to an aircraft accident

## SECRETARY GENERAL OF WORLD MEDICAL ASSOCIATION VISITS RANDOLPH AIR FORCE BASE

Doctor Louis H. Bauer, Secretary General of the World Medical Association and past President of the American Medical Association, recently visited the School of Aviation Medicine, Randolph Air Force Base, Tex., and addressed the student officers. The photograph shows Doctor Bauer with Major General Otis O. Benson, Jr., Commandant of the School. Dr. Bauer himself was Commandant of the School after World War I and is at present a member of the Board of Visitors. Air University of which the School of Aviation Medicine is a part. He is a founder of the Aero Medical Association and Editor Emeritus of its journal *The Journal of Aviation Medicine*.



General Benson recently advanced to the two-star rank. He has had a distinguished career in aviation medicine. Presently assigned as Commandant of the School of Aviation Medicine for the second time in his career, he has like Dr. Bauer been the recipient of the John Jeffries Award of the Institute of Aeronautical Sciences and the Theodore C. Lyser Award of the Aero Medical Association. He was awarded an honorary Doctor of Science degree from the University of Montana in 1955. General Benson is Vice Chairman for Aviation Medicine of the American Board of Preventive Medicine.

## ASSISTANT SECRETARY OF DEFENSE VISITS MILITARY AVIATION MEDICAL FACILITIES

During the first week in April the Honorable Frank B. Berry, Assistant Secretary of Defense (Health and Medical), was accompanied by guests from the Department of National Defence of Canada and by members of his own Civilian Health and Medical Advisory Council on an orientation visit to several military aviation centers in Alabama and Florida.



Arrival at Forrest Sherman Field of Honorable Frank B. Berry, Assistant Secretary of Defense (Health and Medical), with members of the Department of Defense Civilian Health and Medical Council and medical personnel of the Canadian Department of National Defence.

Distinguished Canadian guests included Dr. J. A. MacFarlane, Chairman, Canadian Forces Medical Council; Brigadier A. A. Hunter, Commander, Air Services Department of National Defence; Air Commodore A. A. G. Corbet, Director General of Medical Services; Royal Canadian Air Force; Dr. R. Ian Macdonald, Consultant in Medicine to the Canadian Forces Medical Council; and Wing Commander J. C. Wickett, Royal Canadian Air Force Medical Liaison Officer, Canadian Joint Staff, Washington.

Others accompanying Dr. Berry were Dr. E. H. Cushing, Deputy Assistant Secretary of Defense (Health and Medical); Dr. Melvin A. Casberg, Vice President, Medical Affairs, University of Texas; Dr. Thomas P. Fox, Professor of Oral Surgery, Jefferson Medical School; Dr. Anthony J. J. Rouke, Hospital Consultant, New Rochelle, N. Y.

June 1957)

## DIGNITARIES VISIT MEDICAL FACILITIES

923

Dr James E McCormack Assistant Vice President, Presbyterian Hospital, New York City Dr Wilbert C Davison, Dean, Medical School Duke University, Surgeon Commander Frank P Ellis, Her Majesty's Royal Navy and Mrs Mildred L McBlair, Executive Assistant to Dr Berry

At the Headquarters Air University, Maxwell Air Force Base the group was briefed on the missions of the Air War College, the Air Command and Staff College the Air Force Institute of Technology and the Air Force Reserve Officers Training Corps The group also visited the 3810th U S Air Force Hospital



Dr Berry being greeted at Eglin Air Force Base by Major General Robert W Burns Commander of the Air Proving Ground Command, Colonel Charles H Morhouse Commander of the 3201st U S Air Force Hospital and Colonel Frank H Mears Commander of Eglin Air Force Base

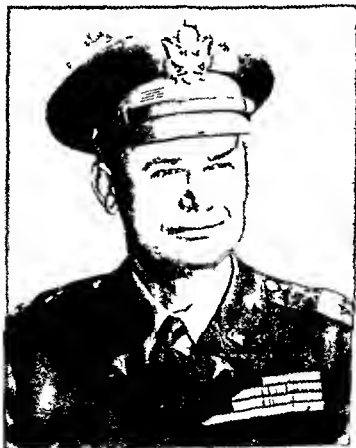
At nearby Gunter Air Force Base, there was a comprehensive briefing on the Gunter Branch of the School of Aviation Medicine U S Air Force Air University followed by a tour of many of the classrooms and laboratories

At the Headquarters, Naval Air Training Command Naval Air Station Pensacola the group was briefed both on Naval Air Basic Training and on the training and research activities of the School of Aviation Medicine Tours were made of all the School facilities The group also visited the U S Naval Hospital Pensacola where Dr Berry met with the hospital staff

The fourth visit of Dr Berry's party was to Eglin Air Force Base where they inspected the facilities of the 3201st U S Air Force Hospital with an explanation of the mission of the Air Proving Ground

## MILITARY SURGEONS CONVENTION CHAIRMEN ANNOUNCED

*Committee chairmen for the 64th annual convention of the Association of Military Surgeons of the United States which will be held at the Hotel Statler in Washington D C 28-30 October 1957 have been announced by the association President Colonel Amos R Kohnitz MC Maryland National Guard They are General Chairman Major General Paul I Robinson MC USA Director Office for Dependents Medical Care Program Chairman Colonel Robert C Kimberly MC Maryland National Guard Scientific Exhibits Captain William M Silliphant MC USN Director Armed Forces Institute of Pathology and Commercial Exhibits Mr Steven B Herlitz New York City*



*The new General Chairman Major General Paul I Robinson MC USA*

Membership in the Association is open to all present and former officers of the Medical, Dental, Veterinary, Medical Service Nurse, and Medical Specialist Corps of the Army, Navy, and Air Force, as well as personnel from the Public Health Service and Veterans Administration.

Each year the convention draws some 2,000 members from all parts of the Nation, as well as leading medical members of military organizations from other countries. The theme of the 64th annual convention will be "Professional Excellence—the Criterion of Military Medicine."

---

#### INTERNATIONAL NAVAL REVIEW

An International Naval Review, the first staged in this country since 1907, will be held on 12 or 13 June in Hampton Roads, Va., in connection with the celebration of the anniversary of the first permanent settlement by English speaking colonists in the United States at Jamestown, Va.

This full dress review is expected to be the largest ever held anywhere, with 27 nations invited to send ships to Hampton Roads for the occasion. The nations participating will be those who have some reason to take part in celebrating the founding of Jamestown and the colonization of North America.



Reviews of Recent Books

DORLAND'S ILLUSTRATED MEDICAL DICTIONARY Including Modern  
Drugs and Dosage by Austin Smith C M M D and Fundamentals  
of Medical Etymology by Lloyd W. Daly A M Ph D Editorial  
Board Leslie Brainerd Arey Ph D Sc D LL D William Burrous  
Ph D J P Greenhill M D and Richard M. Hewitt A M M D  
Philological Consultants Paul J. Alexander Ph D and Harry C.  
Messenger M D 23d edition 1598 pages more than 700 illustrations  
and 50 plates W B Saunders Co Philadelphia Pa 1957 Price  
\$12 50

This is an old friend and standby that fulfills its purpose of giving  
its users "an up-to-date medical dictionary sufficiently full for the  
varied requirements of all classes of medical men." Appropriately  
The American Illustrated Medical Dictionary has been renamed Dor  
land's Illustrated Medical Dictionary in attune with the title by which  
it has been commonly known

The page size of the Dictionary has been increased slightly to make  
possible the inclusion of thousands of new terms. Many definitions  
have been rewritten to keep pace with "changing concepts or expanded  
knowledge" and numerous typographic errors that appeared in the  
twenty second edition have been corrected. The rewritten tables of  
the arteries, muscles, and nerves are based on material prepared under  
the sponsorship of the National Academy of Sciences and conform in  
part to the Nomina Anatomica as revised by the International Anatomical  
Nomenclature Committee. A welcome and useful new feature is Notes  
on the Use of This Dictionary

The typography is good. Phonetic respelling of main entries is as  
simple as possible and immediately follows the boldfaced entry

All in all this dictionary continues to live up to its wide reputation  
as a significant and essential desk reference for students, medical  
authors or editors, physicians, and others interested in medicine and  
allied fields —E. W. MARTIN

THE UNITED STATES AIR FORCE DICTIONARY edited by Woodford Agee  
Heflin, 578 pages D Van Nostrand Co Inc Princeton N J 1957  
Price \$4 75

Since the flight of the Wright brothers at Kitty Hawk in 1903 there  
has been a build up of terminology that is peculiar to aeronautical  
sciences and allied disciplines. This terminology received its first  
momentum in World War I while there was provided a tremendous  
impetus to this trend during World War II

At first one might think that the language of airmen was jargon or slang which had little genuine application and could be hardly understood or deciphered. This work dispels that concept.

Of particular interest among the 16,000 entries are the authorized and unauthorized abbreviations and designations of the Air Force which have often confounded the average military reader. There are also listed meteorologic, navigational, electronics, and radar terms which are in common usage today but perhaps not always fully understood. In addition many scientific and medical terms some applicable to aviation medicine, are clearly defined.

It is of particular value and interest to those who are engaged in writing for official and nonofficial military publications. Perhaps this may be termed a dictionary of special vocabulary for certainly the vast majority of the terms cannot be found in Webster's. The book reflects fine workmanship of a large staff of interested editors both civilian and military at the Air University.

—PAUL V DAVIS Col USAF (MC)

**NOTES ON ATOMIC ENERGY FOR MEDICAL OFFICERS** by The Royal Naval Medical School Alverstoke Hampshire, England 169 pages illustrated Philosophical Library, Inc, New York N Y 1956. Price \$4.75

This small handbook prepared by the Staff of the Royal Naval Medical School provides basic information on the phenomenology of atomic explosions and of the consequences to man. Gamma radiation effects are dealt with mainly.

There are also brief chapters on atomic structure, nuclear physics and monitoring instruments which serve as useful introductions to these subjects. The appendix includes the periodic table of elements a short table of physical constants and certain peacetime tolerances for radiation exposures.

The book will be of value to the medical officer desiring a simplified yet concise account of atomic energy as it relates to military medicine.

—KENT T. WOODWARD Maj MC USA

**PHYSICAL EXAMINATION IN HEALTH AND DISEASE** by Rudolph H Kampmeier A B M D 774 pages illustrated 2d edition F A Davis Co Philadelphia Pa 1957 Price \$9.50

An organized and practical approach to physical examination—the original means of diagnosis—is used in this text.

As in the first edition two chapters are devoted to each body region the first dealing with normal findings the second with abnormal and disease states. Anatomic, pathologic, and physiological correlations are stressed. Each chapter is liberally supplemented with photographs.

The entire opening chapter is devoted to history taking. There are no separate chapters on neurologic examinations. This part of the examination being included in the various chapters on separate regions of the body.

This book is well written and should prove of value both as a text for students and as a reference book in medical libraries.

—JULES J McNEENEY Lt Col MC USA

**GUIDE TO MEDICAL WRITING** A Practical Manual for Physicians, Dentists, Nurses, Pharmacists by Henry A Davidson M D 338 pages 11 illustrated The Ronald Press Co New York N Y 1957 Price \$5

Although many physicians at one time or another write professional articles few are familiar with the requirements of good medical writing. The practitioner's energies are so largely consumed by his major work that he has little time or taste for the cultivation of skill in writing.

This guide is intended to help him develop such skills. It attempts to show the prospective author how to pin down his ideas, how to organize his subject matter, how to master the mechanics of presentation, and how to put it in readable form. Emphasis is placed on practical points—research methods, outlining, revision, summaries, choice of vigorous words, and the arrangement of pictures and charts. In addition to advice on writing skills, the book covers the intricacies of punctuation, spelling, grammar, and bibliography. Particularly valuable for constant reference are the dosage conversion tables and lists of generic equivalents to the trade names of drugs.

One might suggest that a more complete breakdown of the text into headings of co-ordinate grade or superior and subordinate grades and a more complete index would increase the effectiveness of the book as a ready reference. As an adjunct to other texts on the subject, however, this work certainly deserves shelf space in the library of anyone who attempts medical writing, particularly the novice.

—FRANKLIN M. ROBERTS Lt MC USNR

**THE CIBA COLLECTION OF MEDICAL ILLUSTRATIONS** Volume 3 A Compilation of Paintings on the Normal and Pathologic Anatomy of the DIGESTIVE SYSTEM Part III Liver, Biliary Tract and Pancreas Prepared by Frank H Netter M D Edited by Ernst Oppenheimer M D Five sections XV to XIX 165 pages 133 colored plates Publications Department CIBA Pharmaceutical Products Inc Summit N J 1957 Price \$10 50

Most practicing physicians are familiar with the colored plates on many systems and disease states distributed from time to time by CIBA. This volume is much more than merely a collection of those previously distributed booklets. It is a compilation of most aspects of the liver, pancreas and biliary tree including anatomy, physiology, biochemistry, diagnostic methods and disease states simplified to two dimensional multicolored plates which are easily understandable.

June 1957)

## REVIEWS OF RECENT BOOKS

0220

These interpretive visual demonstrations depict the newer concepts of liver structure functional aspects as related to morphology, pathogenesis of hepatic and pancreatic disease, and refined discriminations of various entities

For purposes of continuity the first section covers normal anatomy and the second physiology and pathophysiology including diagnostic tests. A full section is then devoted to each of the organs namely, diseases of the liver, diseases of the gallbladder and bile ducts, and diseases of the pancreas.

Each group of plates is accompanied by a well written discussion of the topic. An excellent bibliography for reference for more complicated discussion of the subjects is presented in the back of this book.

This volume is not a substitute for any one of the excellent text books on these organs but is a supplement, leading to a clearer understanding of this complicated area of the human body. It should prove invaluable to the resident in internal medicine or surgery.

—LESTER P. POPE Capt MC USN

THE YEAR BOOK OF DRUG THERAPY (1956 1957 Year Book Series) edited by Harry Beckman M D 514 pages illustrated The Year Book Publishers Inc Chicago Ill 1957 Price \$6 75

A yearbook on drug therapy is most appropriate and necessary now a days when there are many new chemicals and numerous trade names for similar products. A number of abstracts in this volume discuss unexpected and undesired reactions to therapy. This information is especially important because while the new drugs have many advantages, their potentialities for harm are often equally great.

In this particular edition the choice of the articles is very good and there is a liberal sprinkling of editorial footnotes which adds to the interest and value of the book. This book is a valuable addition to any doctor's library allowing rapid survey of articles on therapy from a great many more sources than most of us have time to examine.

—JAMES L. TOBIN Col. USAF (MC)

PROCEEDINGS OF THE THIRD NATIONAL CANCER CONFERENCE Detroit Mich June 4 6 1956 Sponsored by American Cancer Society Inc and National Cancer Institute U S Public Health Service 961 pages illustrated J B Lippincott Co Philadelphia Pa 1957 Price \$9

This is a comprehensive and up to-date review of the broad field of cancer and upholds the high standards achieved on the preceding conferences of 1949 and 1952. The cancer problem is covered from the broad aspects of epidemiology as a tool in research to detailed considerations of various neoplasms involving specific organs. It represents the combined efforts of over two hundred essayists and discussers who are recognized authorities in the fields of cancer research, diagnosis prognosis and treatment.

The first 13 pages are devoted to the opening remarks which clearly set forth the ideals and purpose of the conference and the summaries which are masterpiece condensations of the vast material contained in this volume. The second part consists of general lectures concerning the subjects of epidemiology, radiation neoplasia, virus etiology, chemical effects of growing tumors on the host with special reference to iron factors influencing curability, and measurement of morbidity. The third part consists of symposiums and panels covering cancer of the breast, prostate, lung, head and neck, female genital tract, gastrointestinal tract, lymphomas and leukemias, and chemotherapy. The end results of treatment are covered in detail.

The American Cancer Society and the National Cancer Institute co-sponsors of this book deserve the highest commendation for this invaluable compilation of information on cancer.

—FRANK M. TOWNSEND Col USAF (VC)

**CLINICAL UROLOGY FOR GENERAL PRACTICE** by Justin J. Cordonnier  
M. D. F. A. C. S. 237 pages illustrated Th. C. & Mosby Co. St.  
Louis Mo. 1956. Price \$6.75

In 233 pages of text the author has condensed all the urologic information which the intern or general practitioner will need and for the specialist urology is outlined in such a succinct, factual manner as to make it a refreshing reference manual.

Diagnosis and treatment of the surgical diseases of the genitourinary tract are described briefly and in an up-to-date manner except for surgical techniques. Pathology is illustrated by photomicrographs and roentgenograms of a size and detail rarely encountered today and rivaled only in clarity by the refreshingly large textual print. The chapters are predicated on pathology, simply indexed and followed by ample current references which reflect the didactic approach of this noted professor.

Any urologist perusing Dr. Cordonnier's book might even say, "I wish I had written that!"

—CHARLES W. HOFFMAN J. U. Col. MC USA

**PRACTICAL DERMATOLOGY** by Samuel H. Peck, B. S., M. D. with Lawrence L. Palusz, M. D., Ph. D. 360 pages illustrated. Landsberger Medical Books, Inc. Distributed by The Blakiston Division, The McGraw-Hill Book Co., Inc. New York, N. Y. 1956. Price \$7.

According to the preface, this book was written for the busy general practitioner. The first chapter is devoted to general remarks on diagnosis and treatment and is exceptionally well written. A discussion of industrial dermatoses is excellent and brief. The rest of the book is devoted to clinical dermatology. There are 122 black and white photographs. Several of these, although technically good, are not particularly illustrative of the designated disease.

Throughout the book the authors stress the use of simple forms of treatment, such as the statement on page 24 that wet dressings or a soothing ointment will frequently do as well or better than expensive steroids. In general, they appear overoptimistic as to the results of treatment but do not overemphasize the use of x ray and steroids.

The authors are to be commended for the brevity of their descriptions. However, in some diseases the discussions are so short that they lack clinical descriptions. The book is well written, however, and can be recommended to the general practitioner.

—MARLYN MARSS, CAPT. MC USA

**ALLERGIC DERMATOSES DUE TO PHYSICAL AGENTS** edited by Rudolf L. Baer M D 110 pages illustrated Published by New York University Press Distributed by J B Lippincott Co, Philadelphia, Pa 1956. Price \$3

In this symposium on allergic dermatoses the authors have in a few pages, summarized what is presently known on the subject of physical dermatologic allergy. Included in the six chapters of this book is a discussion of the general treatment of allergic hypersensitivity to physical agents including trauma, light, heat, and cold.

This little volume is primarily of interest to dermatologists and allergists and has its place in their libraries as it is the only symposium entailing and correlating the various physical cutaneous sensitivities. Though the discussion of the various conditions is brief, the bibliography given at the end of each chapter is most adequate. This compendium is also of value to students of dermatology and allergy in preparing for their specialty boards.

—LOUIS S. LFLAND, COL. MC USA

**MODERN OFFICE GYNECOLOGY** by George Blumick M D F A C S, and Sherwin A Kaufman M D F A C S 218 pages 47 illustrations Lea & Febiger Philadelphia Pa 1957 Price \$1.50

A slightly different approach is used in this textbook. The first of three sections deals with the most common gynecologic complaints presented such as abnormal vaginal bleeding, amenorrhea, dysmenorrhea, infertility, leukorrhea, and menopause. Under each heading a differential diagnosis is presented and one or two accepted forms of therapy are given.

The second section contains illustrations on the techniques of performing bimanual pelvic examinations, biopsies, cauterizations, pessary insertions, contraceptive fittings, and taking smears. The diagrammatic drawings are in black and white. The cytology and gross pathology sections contribute very little of value. The third section is really an amplification of the first in that it consists of a bibliography that covers the controversial issues of diagnosis and treatment that were outlined in part one. This bibliography is supplemented with clinical abstracts. Inpatient gynecologic treatment is not discussed.

Although this textbook would be of definite aid to the general practitioner and perhaps to the senior medical student and intern it would be of limited value to the resident or gynecologist

—J WILSON HUSTON Capt MC USN

**CLINICAL UNIPOLAR ELECTROCARDIOGRAPHY** by Bernard S Lipman  
A B M D F A C P and Edward Massie A B M D F A C P  
3d edition 397 pages illustrated The Year Book Publishers Inc  
Chicago Ill 1956 Price \$7 50

This book presents the complicated subject of electrocardiography in a simple and practicable manner as free from detailed and complex discussions as possible. It is intended primarily for those not too experienced in electrocardiography. This edition maintains much the same format of the previous ones with a short introduction including a history and description of the subject. The clinical aspects of electrocardiography such as position of the heart, ventricular enlargement, bundle branch block and myocardial infarction, abnormal patterns and congenital heart disease are discussed. Following the clinical discussion there is a short chapter on the interpretation of the electrocardiogram and a new chapter on spatial vector interpretation followed by a discussion of the cardiac arrhythmias.

The remainder of the book contains a well selected and reproduced illustrative group of 12 lead electrocardiograms including the standard limb leads. The textual material is certainly not controversial. It is not written for the beginner in electrocardiography and because it includes the generally accepted theory and interpretations it is not for the experienced electrocardiographer. There is a good bibliography arranged in alphabetical order of the authors' last names covering the present concepts in electrocardiography.

—WILLIAM D PRESTON Col USAF (MC)

**CHILDREN'S EYE PROBLEMS** by Emanuel Krinsky M D 175 pages  
illustrated Grune & Stratton Inc New York N Y 1956 Price \$6

Although this book is intended primarily for the pediatrician and the general practitioner, the ophthalmologist will find it helpful in dealing with the child as a whole by emphasizing environmental, psychologic, hereditary and systemic influences. The child psychiatrist and school nurse will find this book of value because emphasis has been placed on extraneous factors often responsible for a child's true or imaginary eye problem.

It offers a simple, practical screening method for the general practitioner or public health worker to detect possible eye disorders. False notions and misconceptions by the lay are discussed.

The author stresses that greater reliance is to be placed on objective examination in children. He gives methods of examination using simple instruments which have proved useful in his hands. The book is recommended for all those who see children in their daily practice. —KENNETH E HUDSON Lt Col MC USA

**MUSCLE RELAXANTS IN ANESTHESIOLOGY** by Francis F. Foldes M.D.  
 American Lecture Series, Publication No. 294 A Monograph in The  
 Baerson Division of American Lectures in Anesthesiology, edited  
 by John Adriani M.D. 210 pages illustrated Charles C. Thomas,  
 Publisher, Springfield Ill. 1957 Price \$5.50

Dr. Foldes is well known as an investigator in the field of anesthesiology and is well qualified to write a review on muscle relaxants as they are used in the practice of anesthesia.

The first 56 pages of this book deal with the chemistry, physiology and pharmacology of muscle relaxants. The theories of the mode of action of polarizing and depolarizing relaxants is presented with very clear diagrammatic illustrations. The scientific discussion of the drugs although technical, is clear and easy to follow.

The last hundred pages deal with the clinical application of the muscle relaxants. Dr. Foldes describes very specifically how he uses each drug, the indication and contraindication of each relaxant and the complications that result from the use of muscle relaxants and the management of these complications. During his discussion of anesthesia for the aged, the asthmatic and the cardiac patient, he brings out many fundamental principles of anesthesia.

I especially like the way each chapter starts with an outline thus directing the reader to the highlights of the chapter. There is an impressive bibliography of 414 references and the index is adequate.

—DANIEL M. PINDO Comb. MC USA

**POSITIONING IN RADIOGRAPHY** by A. C. Clark M.B.E.F.S.R. 655  
 pages 2150 illustrations 7th edition Grune & Stratton Inc., New  
 York N.Y. 1956 Price \$29

Through successive editions this text has been enlarged and modernized and has successfully followed the trend and new ideas in radiographic technique. The standard positions used in routine radiography as well as the unusual positions required in special examination are clearly described and illustrated. Line drawings and labeled photographs graphically correlate the external topography with the radiograph desired in a clear manner. Standard exposure factors are included for each examination.

Special sections on pelvimetry, placentography, dental radiography, myelography, stereography and angiography are included. Notes on the use of contrast media and a section on radiation exposure are also of timely interest. The discussion of theory in each section makes the volume additionally useful to those engaged in teaching. The text is well indexed and the desired subject is readily found. The use of accessory equipment such as cones, grids and special holding devices is well described.

The new edition continues to justify its earned position as one of the foremost texts on radiographic technique.

—SYLVESTER F. WILLIAMS Capt. MC



## New Books Received

Books received by the U S Armed Forces Medical Journal are acknowledged in this department Those of greatest interest will be reviewed in a later issue

- WHEN DOCTORS MEET REPORTERS A Frank Discussion by Science Writers and Physicians of the Controversy Between the Press and the Medical Profession compiled by Hilher Kneegbaum 119 pages Published for The Josiah Macy Jr Foundation by New York University Press New York N Y 1957 Price \$2 50
- ATLAS OF NEUROPATHOLOGY by Nathan Malamud M D 468 pages 226 pages of photographs 2 pages of color plates University of California Press Berkeley 4 Calif 1957 Price \$20
- PRINCIPLES OF UROLOGY An Introductory Textbook to the Diseases of the Urogenital Tract by Meredith F Campbell M S M D F A C S 622 pages 319 figures W B Saunders Co Philadelphia Pa 1957 Price \$9 50
- DISEASES OF THE NOSE THROAT AND EAR by Howard Charles Ballenger M D F A C S and John Jacob Ballenger B S M S M D 10th edition 968 pages 550 illustrations and 11 plates in color Lea & Febiger Philadelphia Pa 1957 Price \$17 50
- The Principles and Methods of PHYSICAL DIAGNOSIS Correlation of Physical Signs With Certain Physiological and Pathological Changes in Disease by Simon S Leopold M D with a chapter on Sounds From the Thorax Acoustic Principles by S Reid Warren J Sc D in EE 2d edition 537 pages 379 illustrations and 25 color plates W B Saunders Co Philadelphia Pa 1957
- EXPERIMENTAL PSYCHOPATHOLOGY edited by Paul H Hoch M D and Joseph Zubin Ph D The Proceedings of the Forty-fifth Annual Meeting of the American Psychopathological Association Held in New York City June 1955 275 pages illustrated Grune & Stratton Inc New York N Y 1957 Price \$6 50
- BASIC FACTS OF PHARMACOLOGY by Stuart M Brooks Ph G B S M S 323 pages illustrated W B Saunders Co Philadelphia Pa 1957
- CLINICAL USE OF RADIOISOTOPES A Manual of Technique edited by Theodore F Felds M S F A C R (Assoc) and Lindon Seed M D 17 contributors 455 pages illustrated The Year Book Publishers Inc Chicago Ill 1957 Price \$9 50
- ON BECOMING AN EDUCATED PERSON An Orientation to College by Virginia Voeks 147 pages W B Saunders Co Philadelphia Pa 1957
- THE YEAR BOOK OF THE EYE EAR NOSE AND THROAT (1956-1957 Year Book Series) The Eye edited by Derrick Val B A M D D Oph (Oxon) F A C S F R C S (Hon) The Ear Nos and Throat edited by John R Lindsay M D 448 pages illustrated The Year Book Publishers Inc Chicago Ill 1957 Price \$7

June 1957)

# NEW BOOKS RECEIVED

935

UROLOGIC INJURIES IN GYNECOLOGY Including Vesicovaginal Fistula Stress Incontinence, and Ureteral Injuries by *Henry C Falk* M D F A C S A Series of Monographs, Obstetrics & Gynecology edited by *Claude E Heaton* M D 285 pages 97 illustrations F A Davis Co, Philadelphia Pa 1957 Price \$7 50

MODERN TREATMENT YEARBOOK 1957 A Yearbook of Diagnosis and Treatment for the General Practitioner, edited by *Sir Cecil Wakeley* Bt K B E C B 312 pages illustrated Published for The Medical Press by Bailliere Tindall & Cox Ltd London W C 2 1957 Distributed by The Williams & Wilkins Co Baltimore Md

DIAGNOSIS AND TREATMENT OF CARDIOVASCULAR DISEASE 5th edition in 2 volumes edited by *William D Stroud* M D, F A C P and *Morris W Stroud* III M D Sixty contributors Volume 1 Chapters 1 through 29 pages 1 through 719 illustrated Volume 2 Chapters 30 through 53 pages 1 001 through 1 702 illustrated F A Davis Co, Philadelphia Pa 1957 Price \$35 per set of 2 volumes

PIONEER SURGEONS OF THE WOMAN'S HOSPITAL The Lives of Sims, Emmet Peaslee and Thomas by *James Pratt Marr* M D 148 pages illustrated F A Davis Co Philadelphia Pa 1957

GESTATION Transactions of the Third Conference March 6 7 and 8 1956, Princeton N J edited by *Claude A Villev* Ph D 253 pages illustrated *Josiah Macy Jr* Foundation Publications, New York N Y 1957 Price \$4 75

THE DOCTOR HIS PATIENT AND THE ILLNESS by *Michael Balint* M D Foreword by *Maurice Levine* M D 355 pages International Universities Press Inc New York N Y 1957 Price \$7 50

COLD INJURY Transactions of the Fourth Conference November 7 8 and 9 1955 Princeton N J edited by *M Irene Ferrer* M D 371 pages illustrated *Josiah Macy Jr* Foundation Publications New York N Y 1956 Price \$5 95

SPEECH CORRECTION AT HOME, by *Morris Val Jones* Ph D Foreword by *Herbert C Moffitt Jr* M D 138 pages illustrated Charles C Thomas Publisher Springfield Ill 1957 Price \$4 75

GETTING READY FOR PARENTHOOD A Manual for Expectant Mothers and Fathers by *Mario A Castallo* M D Sc D (Hon) F A C S 192 pages illustrated The Macmillan Co New York N Y 1957 Price \$3 95

THE INVESTIGATION OF DEATH by *Donald Karl Merkeley* M D Med Sc D (Forensic Medicine) A Monograph in The Police Science Series edited by *V A Leonard* 138 pages illustrated Charles C Thomas Publisher Springfield Ill 1957 Price \$4 50

GIFFORDS TEXTBOOK OF OPHTHALMOLOGY by *Francis Heed Adler* M D 6th edition 499 pages 227 figures with 26 color plates W B Saunders Co Philadelphia Pa 1957

WORLD-ATLAS OF EPIDEMIC DISEASES Part III First of four issues, edited by Professor Dr med *Ernst Rodemwaldt* and Privatdozent Dr med habil *Helmut J Jusatz* Heidelberg under the sponsorship of the *Heidelberger Akademie Der Wissenschaften*. 36 pages 10 colored maps in hard back binder 15½ by 19 inches in size loose-leaf with three brass screw posts of size suitable for insertion of forthcoming second third and fourth issues Volk Verlag Hamburg I Germany 1957 Price DM 75 plus extra charge for postage and packing

- CLINICAL ELECTROCARDIOGRAPHY** Interpretation on a Physiologic Basis by *Manuel Gardberg* M D with chapters by *Richard Ashman*, Ph D *Irving L. Rosen* M D and *Louis Levy* M D 395 pages illustrated *Paul B Hoeber Inc* Medical Book Dept of Harper & Bros New York N Y 1957 Price \$12 75
- HUMAN BLOOD GROUPS AND INHERITANCE** by *Sylvia D Lawler* M D and *L J Lawler* B Sc with a foreword by *R R Race* Ph D M R C S (England) F R S 103 pages illustrated *Harvard University Press* Cambridge Mass 1957 Price \$1 50
- THERAPEUTIC EXERCISE** for Body Alignment and Function by *Marian Williams* Ph D and *Catherine Woottingham* Ph D Exercise illustrations by *Harold Black* 127 pages illustrated *W B Saunders Co* Philadelphia Pa 1957
- HUMAN CANCER** A Manual for Students and Physicians by *Maurice H Black* M D and *Francis D Speer* M O F C A P 273 pages illustrated *The Year Book Publishers Inc* Chicago Ill 1957 Price \$7 50
- ATLAS OF CLINICAL ENDOCRINOLOGY** Including Text of Diagnosis and Treatment by *H Lissner* A B M D and *Roberto F Escamilla* A B M D 476 pages 148 plates including 3 in color *The C V Mosby Co* St Louis Mo 1957 Price \$18 75
- BLOOD AND BONE MARROW PATTERNS** by *G D Talbot* M D *Elmer R Hunsicker* B S and *Jonah L L M D* 59 pages illustrated with 145 colored photomicrograph *Grune & Stratton Inc* New York N Y 1957 Price \$12
- SPINAL CORD COMPRESSION** Mechanism of Paralysis and Treatment by *I M Tarlov* M D 147 pages illustrated *Charles C Thomas Publisher* Springfield Ill 1957 Price \$7 50
- 1957 MEDICAL PROGRESS** A Review of Medical Advances During 1956, by *Morris Fishbein* M D 367 pages *The Blakiston Division McGraw-Hill Book Co Inc* New York N Y 1957 Price \$6
- A Laboratory Guide to ANATOMY AND PHYSIOLOGY** by *Barry G King* Ph D and *Mary Jane Showers* R N M S Illustrations by *Phyllis Anderson* 161 pages 77 illustrations *W B Saunders Co* Philadelphia Pa 1957
- SURGERY** Principles and Practice by *J Garrett Allen* M O *Henry A Harkins* M D Ph D *Carl A Meyer* M O and *Jonathan E Rhoads* M D D SC (Med) with 32 contributors 1 495 pages 63 illustrations *J B Lippincott Co* Philadelphia Pa 1957 Price \$16
- MANUAL OF RADIATION THERAPY** by *K Wilhelm Stenstrom* Ph D Collected by *John B Coleman* M D Revised with Additions and Discussions by *Paul C Olfelt* M D and *Frances Conkle* M D 94 pages *Charles C Thomas Publisher* Springfield Ill 1957 Price \$4 50
- SYNOPSIS OF GASTROENTEROLOGY** by *Rudolf Schindler* M D F A C P 395 pages illustrated *Grune & Stratton Inc* New York N Y 1957 Price \$7 75
- THE YEAR BOOK OF UROLOGY (1956-1957 Year Book Series)** edited by *William Wallace Scott* M D Ph D 382 pages illustrated *The Year Book Publishers Inc* Chicago Ill 1957 Price \$6 75
- PEDIATRIC CLINICS OF NORTH AMERICA** Symposium on Pediatric Hematology May 1957 *Hof W Zuelzer* M O Consulting Editor 591 pages illustrated *W B Saunders Co* Philadelphia Pa 1957

# UNITED STATES ARMED FORCES MEDICAL JOURNAL

*Published Monthly by  
the Armed Forces Medical Publication Agency  
Department of Defense*



*Editor*

CAPTAIN BENNETT F AVERY, MC, USN

*Associate Editors*

COLONEL ROBERT S ANDERSON, MC, USA

COLONEL PAUL V DAVIS, USAF (MC)

*Assistant Editor*

LIEUTENANT FRANKLIN M ROBERTS, MC, USNR

UNITED STATES  
GOVERNMENT PRINTING OFFICE  
WASHINGTON 1957

# Monthly Message

As the Fourth of July approaches, I should like to print a letter\* written by a doctor in the Army from Camp Wilmington, North Carolina on July 13 1776, that it may remind all of you who are now privileged to serve with the Armed Forces, of earlier days and more difficult conditions. At that time we were fighting for the same independence which other nations desire today. Independence is not to be confused with "unbridled license," but is rather the freedom of living among men and nations with respect by all for one another.

Camp at Wilmington July 13 1776

"Sir

I beg the honor of you to let me know whether there is any provision made by Continental Congress For supporting the regiments in this Province with medicines I have hitherto used my own but unless I have a new supply shall soon be out of some of the most principle articles I could have supplied myself had I been supplied with mooney but the Paymaster refuses to advance any mooney For that purpose The consumption of medicines is very great For 3 weeks Past I've had From 20 to 30 in the hospital belonging to the 5th regiment The sickly season is now coming on Fast and unless I'm speedily supplied I shall be destitute of such medicines as I find of most service here I furthermore beg the favor of you Sir to let me know what a surgeon's pay is how many rations he is allowed whether there is any more allowed if so what his pay is to be and who appoints Him Your compliance will much oblige

"Sir your most Obedient Hum Servant

*Frank B Berry*

FRANK B BERRY  
Assistant Secretary of Defense  
(Health and Medical)

# Table of Contents

	Page
Physiological Investigations in the Flying Safety Program of the Flying Training Air Force— <i>William H. Lauton</i> .....	937
Genitourinary Tuberculosis— <i>Stephen J. Berte</i> .....	945
Tuberculin Sensitivity Among Army Children— <i>Thomas A. Hanson and Mercedes Fischer</i> .....	957
Treating Tuberculosis in a Military Hospital— <i>Richard M. Burke and James A. Wier</i> .....	963
Cineplasty Results of Follow Up Study— <i>Thomas J. Canty and Eugene E. Black</i> .....	972
Simplified Method of Pulp Capping Adult Teeth With Calcium Hydroxide— <i>Everett D. Mumaw and Phillip Cooper</i> .....	979
Subungual Exostosis— <i>Richard S. Gilbert and Herbert H. Stark</i> .....	985
Simplified Microradiography of Bone and Teeth— <i>John T. Istock, Clarence W. Miller and Fred L. Losee</i> .....	991
CLINICOPATHOLOGIC CONFERENCE	
Volley Forge Army Hospital, Phoenixville, Pa. ....	998
SERVICE ARTICLES	
Mental Illness and Classified Information— <i>Mortimer V. Kleinmann, Jr. and Edward F. Frise</i> .....	1007
Flight Indoctrination Program At a United States Marine Corps Air Station— <i>Russell G. Wistner</i> .....	1017
CASE REPORTS	
Lorvol Granulomatosis: Diagnosis by Needle Biopsy of the Liver— <i>Ogden C. Bruton and William J. Jaffurs</i> .....	1022
Acute Pulmonary Edema During Intermittent Positive Pressure Breathing— <i>James C. Syner</i> .....	1027
Total Pancreatectomy for Chronic Relapsing Pancreatitis and Calcification of the Pancreas— <i>O'Neill Barrett, Jr. and Warner F. Bowers</i> .....	1037
Transverse Aberrant Testicular Moldscent— <i>Joseph E. Davis</i> .....	1046
Multiple Subcutaneous Granular Cell Myoblastoma— <i>Harold K. Alsobrook and James H. Lockwood</i> .....	1051
Porencephaly— <i>Theodore H. Wilson, Jr.</i> .....	1057
DEPARTMENTS	
A Message From the A. M. A. ....	1062
Ground Broken for New Air Force School of Aviation Medicine.....	1065

# TABLE OF CONTENTS—Continued

DEPARTMENTS—Continued	
Leaders in Military Medicine Attend Reception for Secretary of Defense	1069
Cobalt Irradiator in Clinical Use at National Naval Medical Center	1071
Navy Preventive Medicine Unit Commissioned at Naples, Italy	1073
Deaths	1075
Former Editor of Journal Receives Decoration	1076
Officers Certified by Specialty Boards	1077
BOOKS	
Reviews of Recent Books	1078
New Books Received	1090

## Foreword

The *United States Armed Forces Medical Journal* is the medium for disseminating information of administrative and professional interest to all medical personnel of the Department of Defense. The Assistant Secretary of Defense (Health and Medical) and the Surgeon General of the several services invite all medical officers, dental officers, Medical Service Corps officers, Nurse Corps officers and officers of the Veterinary Corps of the Armed Forces and the medical consultants of the Army, Navy and Air Force to submit manuscripts for publication in this journal.

FRANK B. BERRY, M.D.  
Assistant Secretary of Defense (Health and Medical)

MAJOR GENERAL SILAS B. HAYS  
Surgeon General, United States Army

REAR ADMIRAL BARTHOLOMEW W. HOGAN  
Surgeon General, United States Navy

MAJOR GENERAL DAN C. OGLE  
Surgeon General, United States Air Force

# UNITED STATES ARMED FORCES MEDICAL JOURNAL

---

Volume VIII

July 1957

Number 7

---

## PHYSIOLOGICAL INVESTIGATIONS IN THE FLYING SAFETY PROGRAM OF THE FLYING TRAINING AIR FORCE

WILLIAM H. LAWTON *Colonel USAF (MC)*

**T**HE subject for today is one in which we are all vitally interested, namely, flying safety.

I came to the Flying Training Air Force (FTAF) when it was first organized in 1951, and since then everyone in my office has been working closely with our Flying Safety people, with our Training and Operations Section, with our Base Commanders, and also with our Commanding General in an effort to reduce the aircraft accident rate. This accident rate has fallen from a high of 56.2 per 100,000 flying hours in 1951 to a low of 10.4 in 1956. In the Surgeon's Office, we have been working along the lines of physiological investigation to improve flying safety. The methods we have used in helping reduce our accident rates will be presented.

The importance of hypoxia<sup>1</sup> as related to the safety of flying personnel is well recognized, and elaborate measures have been taken to prevent it. Two other conditions which are physiologically abnormal, the symptoms of which may be confusing or add to the symptoms of the hypoxic syndrome, are hyperventilation with hypocapnia and hypoglycemia, or relative hypoglycemia.

### HYPERVENTILATION

Hyperventilation in an aviator, according to Lillehei and Balke,<sup>2</sup> if progressive, may reduce the carbon dioxide below a critical

---

<sup>1</sup>Presented before the Joint Committee on Aviation Pathology at the Armed Forces Institute of Pathology, Washington, D. C., 16 November 1956.

<sup>2</sup>From Flying Training Air Force, Waco, Tex.



level which results in performance impairment, tetany, and unconsciousness. These authors found that lowering the alveolar carbon dioxide tension below 25 mm of mercury by voluntary hyperventilation in normal young men caused a significant impairment of psychomotor performance as tested on the Air Force Complex Coordinating Apparatus. In addition, tetany with severe spasms of the wrists and fingers resulted when an average of 3.5 liters of carbon dioxide per square meter of body surface area were lost from the body reservoir.

Balko, Wolls, and Clark,<sup>3</sup> continuing the work on hyperventilation at the U S Air Force School of Aviation Medicine, confirmed the findings of the earlier study and added that susceptibility to hyperventilation varied greatly from individual to individual, some demonstrating severe tetany, others only slight tingling or no symptoms at all when exposed to the same experimental conditions. Of the 26 student pilots subjected to in flight tests it was observed that otherwise very efficient students made mistakes, became progressively confused, and showed low carbon dioxide values. Symptoms noted during mechanically induced hyperventilation in the laboratory are summarized in table 1. Despite these subjective and objective symptoms, it was apparent that "healthy young individuals in good physical condition have a good resistance to relatively severe degrees of hypocapnia. For that reason there will continue to be much speculation about the possibility of aircraft incidents or accidents caused by hyperventilation."

TABLE 1 Symptoms noted in 14 subjects during mechanically induced hyperventilation

Symptoms	Number of subjects	Per cent
Tingling	11	79
Dizziness	7	50
Tremor	6	43
Tightness of muscles	5	36
Carpopedal spasms	5	36
Inability to speak	3	21
Disturbance of vision	2	14
Neurocirculatory disturbances (sweating, chills, etc.)	2	14
Drowsiness, sleepiness	1	7
Jerking of extremities	1	7

In 1952 Hall<sup>4</sup> found 53 cases of involuntary hyperventilation out of 695 exposures to a simulated altitude of 43 000 f

July 1957)

# FLYING SAFETY PROGRAM

939

During pressure breathing it was also noted that the earlier symptoms of hypoxia and hyperventilation with hypocapnia are similar and confusing

The work cited above, coupled with the earlier work of Pinshaw and co-workers, and Rushmer and Bond,' suggested strongly that some of our accidents were due to hyperventilation rather than to hypoxia. In order to get more specific information on the differential diagnosis, a Physiological Near Accident Report was instituted in our Command during the latter part of 1952

During the spring of 1953, an incident occurred in one of our low pressure chambers at a simulated altitude of only 8,000 feet. Inasmuch as hypoxia does not occur ordinarily at altitudes below 12,000 feet, the Flight Surgeon and the Aviation Physiologist in charge of this case were interviewed directly, and it was determined that the subject involved was observed to have had definite hyperventilation preceding his collapse

A second incident, occurring some three months later, was also observed in a low pressure chamber. The student undergoing indoctrination in aviation physiology was subjected to mild hypoxia by disconnecting his oxygen hose at 30,000 feet. This particular student insisted on leaving his hose disconnected longer than directed, and he very shortly collapsed, apparently from hypoxia. His oxygen supply was re established and his recovery was prompt, however, he began breathing very rapidly and deeply, and at 27,000 feet he lost consciousness again, apparently this time from apnea or a combination of apnea and hypoxia. Each time during recovery hyperventilation was repeated, and the subject relapsed at 17,000 feet and again at 8,000 feet. This incident seems to confirm the possibility of hypoxia acting as a "triggering mechanism" for hyperventilation

Following the two incidents outlined above, 64 Physiological Near Accident Reports were reviewed and the impression was gained that many of these could be charged to hyperventilation. In November 1953, we started an intensive indoctrination program regarding hyperventilation, emphasizing the symptoms, dangers, and preventive measures. It was thought that the young student aviator was predisposed to hyperventilation when, with his helmet and face mask in place, he was tightly strapped into the seat of a jet aircraft and the canopy closed with a "thump". He was further conditioned by formation flying at altitudes of 20,000 feet or higher so that any further increase in the stress factors might cause involuntary hyperventilation, with performance impairment and with resulting near accident or actual disaster. One student flying solo a P-6 aircraft reported to the tower that he was in trouble but landed safely through the efforts of an instructor flying wing, plus radio instructions from the Flight Surgeon. On landing, he explained that he could not grasp the

level which results in performance impairment, tetany, and unconsciousness. These authors found that lowering the alveolar carbon dioxide tension below 25 mm of mercury by voluntary hyperventilation in normal young men caused a significant impairment of psychomotor performance as tested on the Air Force Complex Coordinating Apparatus. In addition, tetany with severe spasms of the wrists and fingers resulted when an average of 3.5 liters of carbon dioxide per square meter of body surface area were lost from the body reservoir.

Balke, Wells, and Clark,<sup>3</sup> continuing the work on hyperventilation at the U S Air Force School of Aviation Medicine, confirmed the findings of the earlier study and added that susceptibility to hyperventilation varied greatly from individual to individual, some demonstrating severe tetany, others only slight tingling or no symptoms at all when exposed to the same experimental conditions. Of the 26 student pilots subjected to in flight tests, it was observed that otherwise very efficient students made mistakes, became progressively confused, and showed low carbon dioxide values. Symptoms noted during mechanically induced hyperventilation in the laboratory are summarized in table 1. Despite these subjective and objective symptoms it was apparent that "healthy young individuals in good physical condition have a good resistance to relatively severe degrees of hypocapnia. For that reason there will continue to be much speculation about the possibility of aircraft incidents or accidents caused by hyperventilation."

TABLE 1 Symptoms noted in 14 subjects during mechanically induced hyperventilation

Symptoms	Number of subjects	Per cent
Tingling	11	79
Dizziness	7	50
Tremor	6	43
Tightness of muscles	5	36
Carpopedal spasms	5	36
Inability to speak	3	21
Disturbance of vision	2	14
Neurocirculatory disturbances (sweating, chills et cetera)	2	14
Drowsiness, sleepiness	1	7
Jerking of extremities	1	7

In 1952, Hall<sup>4</sup> found 53 cases of involuntary hyperventilation out of 695 exposures to a simulated altitude of 43,000 feet.

July 1957)

# FLYING SAFETY PROGRAM

939

During pressure breathing it was also noted that the earlier symptoms of hypoxia and hyperventilation with hypocapnia are similar and confusing

The work cited above, coupled with the earlier work of Pinshaw and co-workers<sup>1,2</sup> and Rushmer and Bond,<sup>3</sup> suggested strongly that some of our accidents were due to hyperventilation rather than to hypoxia. In order to get more specific information on the differential diagnosis, a Physiological Near Accident Report was instituted in our Command during the latter part of 1952

During the spring of 1953, an incident occurred in one of our low pressure chambers at a simulated altitude of only 8,000 feet. Inasmuch as hypoxia does not occur ordinarily at altitudes below 12,000 feet, the Flight Surgeon and the Aviation Physiologist in charge of this case were interviewed directly, and it was determined that the subject involved was observed to have had definite hyperventilation preceding his collapse

A second incident, occurring some three months later, was also observed in a low pressure chamber. The student undergoing indoctrination in aviation physiology was subjected to mild hypoxia by disconnecting his oxygen hose at 30,000 feet. This particular student insisted on leaving his hose disconnected longer than directed, and he very shortly collapsed, apparently from hypoxia. His oxygen supply was re-established and his recovery was prompt, however, he began breathing very rapidly and deeply, and at 27,000 feet he lost consciousness again, apparently this time from apnea or a combination of apnea and hypoxia. Each time during recovery, hyperventilation was repeated, and the subject relapsed at 17,000 feet and again at 8,000 feet. This incident seems to confirm the possibility of hypoxia acting as a "triggering mechanism" for hyperventilation

Following the two incidents outlined above, 61 Physiological Near Accident Reports were reviewed and the impression was gained that many of these could be charged to hyperventilation. In November 1953, we started an intensive indoctrination program regarding hyperventilation, emphasizing the symptoms, dangers, and preventive measures. It was thought that the young student aviator was predisposed to hyperventilation when, with his helmet and face mask in place, he was tightly strapped into the seat of a jet aircraft and the canopy closed with a "thump". He was further conditioned by formation flying at altitudes of 20,000 feet or higher so that any further increase in the stress factors might cause involuntary hyperventilation, with performance impairment and with resulting near accident or actual disaster. One student flying solo a T-6 aircraft reported to the tower that he was in trouble but landed safely through the efforts of an instructor flying wing, plus radio instructions from the Flight Surgeon. On landing, he explained that he could not grasp the

stick because his hands were like claws. Another student flying a PA 18 aircraft with an instructor found his hands frozen to the struts. After being landed by the instructor, it required 10 minutes and the efforts of two persons to free the student's hands.

In our indoctrination program young pilots are instructed if flying under 10 000 feet when they begin to hyperventilate to simply hold the breath as long as possible and then resume breathing near the normal rate of 14 per minute. When flying at altitudes where hypoxia can be a factor and it is necessary to differentiate between hypoxia and hyperventilation the pilot is told to first turn his oxygen regulator to 100 per cent oxygen and take three breaths. If he is not improved or possibly feeling a little worse he should then try holding his breath as long as possible, and then resume at the normal rate of 14 per minute. It might be argued here, that taking three more breaths when already hyperventilating might be courting disaster. This has not occurred in our experience.

During the year 1953 before we began this type of briefing, there were 28 unexplained fatal accidents in jet aircraft in the Flying Training Air Force or 1 fatality every 13 days. In 1954 after 1 year's indoctrination of the program outlined there were only 8 unexplained fatalities, or 1 every 45 days. In 1955 there was only 1 every 72 days and in 1956 there were only 2 unexplained fatal accidents. Other factors such as supervision, instruction and maintenance undoubtedly have contributed to this improved safety record.

### RELATIVE HYPOGLYCEMIA

Wiggers<sup>1</sup> defined hypoglycemia as a progressive decrease in blood sugar characterized when it reaches the environs of 75 mg per cent by weakness, trembling, nausea and vomiting. Harrison and Fink<sup>2</sup> defined relative hypoglycemia as a metabolic disorder characterized by nervousness, weakness, palpitation, dizziness, dyspnea, arrhythmias and chest pain—occurring two or more hours after meals. These symptoms can usually be reproduced by insulin, relieved by the ingestion of glucose and prevented by dietary regulation (high protein, low carbohydrate). Blood sugar is found usually slightly subnormal or normal. These authors pointed out that there is a great variation in individual susceptibility, some patients tolerating blood sugars as low as 40 mg per 100 ml without symptoms, while others experience difficulty at 65 to 70 mg per 100 ml.

Diabetics experience insulin overdose manifestations with blood sugars at or above the normal range, an example of relative hypoglycemia. Of the 31 patients observed with sugar tolerance tests by Harrison and Fink, 2 had blood sugar levels below 50 mg per 100 ml, 7 had 50-59, 11 had 60-69, 7 had 70-79 and 1 patient

had 80 The rapid descent of the curve, as well as the minimum level, seemed significant The response to insulin in the reproduction of the symptoms was positive in 15 out of 18 patients tested and is regarded as a valuable diagnostic aid The response to treatment with a high protein, low carbohydrate diet proved one of the most useful diagnostic procedures

In treatment, the diet used by Conn<sup>8</sup> (low carbohydrate, high protein) was usually effective in contrast to high carbohydrate meals with intermediate feedings The high blood sugar produced by the latter regimen apparently produced excessive insulin production Conn and associates<sup>10</sup> pointed out that after a high protein meal, the blood sugar level is relatively stable because the protein is gradually converted to amino acids, which in turn are changed to glucose

From observation of certain low altitude "near accidents" in the Air Force, supported by a limited number of laboratory tests, the conclusion was reached that these accidents might have the etiologic component of relative hypoglycemia The following cases will serve to illustrate this possibility

### CASE REPORTS

**Case 1** A student pilot became unconscious while flying with an instructor at an altitude of 8,000 feet After the plane was landed by the instructor the Flight Surgeon studying the cause of the student's failure did a six hour glucose tolerance test, and at the end of three hours the blood sugar was reported as 53 mg per 100 ml

**Case 2** A young pilot flying solo in a jet plane reported blacking out for a short period at an altitude of only 1,700 feet On recovering he found himself at an altitude of only 200 feet but was able to make a safe landing This individual also was given a six hour glucose tolerance test, and at the end of three hours a low point of 63 mg per 100 ml was reported

**Case 3** A young pilot in a T-33, during a landing about 2100 hours neglected to turn on his landing lights and let his flying speed drop to below 100 knots He failed to take proper corrective measures and his plane stalled dropped 25 to 30 feet to the runway, bounced, and on the second contact with the ground, the landing gear collapsed The pilot was unhurt and the Accident Investigation Board found the accident due to hypoxia Subsequent inquiry from the Flying Safety Officer, however, gave the following information

"This pilot attended a banquet the night before and had a meal presumably a well balanced one at 1900 He did not get to bed until 0330 but arose at 0600 His breakfast consisted of a candy bar and a soft drink He flew with a student for approximately 1 hour and 10 minutes Between the time he landed and 1530 He had additional candy bars and soft drinks He slept 1 hour during the afternoon but prior to take off he had no food except another candy bar and another soft drink "

We considered that a blood sugar deficiency in these three cases contributed to these hazardous conditions. We believe that relative hypoglycemia may play a definite part in some of our aircraft accidents. Certain cases with symptoms due to hypoxia, hyperventilation, and relative hypoglycemia may occur separately or in combination, and the pilot will be more susceptible if he has skipped a meal or has had only a high carbohydrate meal two or more hours previously. In flight, the pilot is subjected to both mental and physical stresses and glucose is imperative for cellular utilization of oxygen, and hence the proper function of the central nervous system. If the pilot eats a high protein meal including eggs and meat, his blood sugar level would be maintained at good levels for a much longer period because as pointed out by Conn and co-workers, these proteins will be converted to amino acids, which in turn will be changed gradually to glucose. With such a diet the pilot is maintained from meal to meal at relatively safe blood sugar levels.

In the Spring of 1955, a visit was made to all of our pilot training bases and our students were interviewed to find out just how many of them were not eating properly before flying. It was discovered that over 50 per cent of our students were not getting up for breakfast. They consequently, were flying without an adequate breakfast, or with none at all, and laying themselves wide open for a pilot-error accident. This situation was discussed with the Commander of Flying Training Air Force and it was decided that something had to be done about it. In June 1955 we initiated a very intensive program to improve the eating habits of our young pilots. This was done by explaining to them and their wives the importance of a well balanced breakfast, lunch, and dinner. It was explained to them that the protein foods—eggs, meat, and milk—are the most important elements in breakfast and other meals, and it is these protein foods that hold the blood sugar level relatively high for a long period of time. Our headquarters also published a directive in which all of our flying students (cadets) as well as officers residing on the base, were required to eat at least two meals breakfast and lunch, at one of the base messes. At the same time, a small snack bar was established in each of our flight briefing buildings. These snack bars were simple affairs, containing a refrigerator and a small counter. The foods stored in the refrigerator were milk, fruit juices, and good sandwiches—meats of all kinds and cheese. We discouraged the use of doughnuts in these snack bars since they consist primarily of carbohydrate and fat which might contribute to overstimulation of the internal secretion of the pancreas. In fact we believe that the best part of the doughnut is the hole in the middle. The snack bars were not open in the morning until after students had taken off on their first flight for we did not want them to use this as a substitute for an ad

July 1957)

## FLYING SAFETY PROGRAM

943

equated breakfast. They were opened prior to the ending of the first flight so that students and instructors could get a bite to eat at a time when their blood sugar level could be expected to be at a comparatively lower level.

This program to improve the eating habits of our pilots has been in effect a little more than a year, and we have indications that it is succeeding. This is reflected in the accident rate. The accident rate for 1954 in Flying Training Air Force was 16.6, in contrast with the rate in 1955 which was 12. The reduction in 1955 occurred primarily in the latter part of the year, after the program had been initiated in June. The aircraft accident rate for the 6 month period was 10.8, which is considered low. In comparison, the aircraft accident rate for the rest of the Air Force, not including Flying Training Air Force, for 1955 was 23, or more than double the FTAF rate. The accident rate in 1956 was 10.4. Together with the reduction in the accident rate, we have had a reduction in the per cent of pilot error accidents, approximately 56, and in 1956 it was 47.2. Another indication is the fact that during the first 6 months after this program was started there was a 2 month period in which no fatalities occurred, the only 2 months since FTAF was organized in 1951 with no fatalities.

To all who are interested in studying the problems of hypoglycemia I make this recommendation: do not limit glucose tolerance tests to 2 or 3 hours. Carry them out to a full 6 hours. Abrahamsen and Pezet<sup>11</sup> pointed out that some cases of hypoglycemia may present completely normal glucose tolerance curves in 2 to 3 hours, but the curve may then descend to near shock levels in the fourth, fifth, or sixth hour.

### SUMMARY

There are three things that we in Flying Training Air Force have done which apparently have helped reduce our aircraft accident rate. They are (1) The initiation of the Physiological Near Accident Report in 1952. These near accident reports give far more information regarding accident causes than the fatal accidents reports, and could be used profitably in all Air Force training centers. (2) The education of our pilots regarding hyperventilation, which pointed out the symptoms and its dangers. (3) Our program for improving the eating habits of our student pilots.

There are many more questions that have to be answered about relative hypoglycemia and hyperventilation. It is believed that we have only scratched the surface. Our Flight Surgeons and our research laboratories are confronted with a definite challenge to obtain firm answers to these problems through the continued



co-ordination of clinical observations with fundamental investigation

## CONCLUSIONS

- 1 Two of the less obvious hazards for pilots in training are hyperventilation with hypocapnia and relative hypoglycemia
- 2 The Flying Safety Program in the Flying Training Air Force has shown a decided decrease in the number of aircraft accidents and near accidents with the recognition and prevention of these hazards
- 3 The future selection and evaluation of student pilots might well include the determination of their susceptibility to hyperventilation with hypocapnia and hypoglycemia

## REFERENCES

- 1 Wiggers C J *Physiology in Health and Disease* Lea & Febiger Philadelphia Pa 1949 Chap 27 Aviation physiology sect 7 chap 49 p 909
- 2 L Hebel J P and Balke B *Studies of Hyperventilation* U S Air Force School of Aviation Medicine Report N 55 62 July 1955
- 3 Balke B Wells J G and Clark R T Jr *In-Flight Studies on Hyperventilation* U S Air Force School of Aviation Medicine Report No 56-69 Jun 1956
- 4 Hall A L *Involuntary hyperventilation during pressure breathing at 43 000 feet* *J Aviat Med* 24 14-19 Feb 1953
- 5 Hinshaw H C and Boothby W M *Syndrom of hyperventilation its importance in aviation* *Proc Staff Meet Mayo Clin* 16 211 213 Apr 2 1941
- 6 Rushmer R F Boothby W M and Hinshaw H C *Sym effects of hyperventilation with special reference to aviation medicine* *Proc Staff Meet Mayo Clin* 16 801 808 Dec 17 1941
- 7 Rushmer R F and Bond D D *Hyperventilation syndrom in flying personnel* *Av Med* 5 302-303 May 1944
- 8 Harris T R and Finks R M *Glucose deficiency as factor in production of symptoms in failure to cardiovascular system* *Am Heart J* 26 147 163 Aug 1943
- 9 Conn J W *Interpretation of glucose tolerance test necessity of standard preparatory diet* *Am J Med Sc* 199 555-564 Apr 1940
- 10 Conn J W Newburgh L H Johnston M W and Sheldon J M *Study of deranged carbohydrate metabolism in chronic alcoholism hepatitis* *Arch Int Med* 62 765-782 Nov 1938
- 11 Abrahamson E M and Perez A W *Body Mind and Sugar* Henry Holt & Co Inc New York N Y 1951

# GENITOURINARY TUBERCULOSIS

STEPHEN J. BERTE *Lieutenant Colonel MC USA*

**G**ENITOURINARY tuberculosis maintains a prominent position in the consideration of human tuberculosis because, in addition to the lungs, the genitourinary tract is one of the most frequent sites of clinically recognizable tuberculosis. The emphasis continues to be on pathogenesis and treatment. Evidence in the literature suggests that infection in the genitourinary tract is secondary to a focus elsewhere in the body. Usually this original focus is in the lungs, bone, or intestine.

Treatment is best considered in terms of the pre streptomycin era and the post streptomycin era. Before streptomycin sulfonamide (SM) was used in the management of tuberculosis, treatment was limited to surgical resection. At one time, it was believed that a diagnosis of unilateral renal tuberculosis should be considered concomitantly with immediate nephrectomy. The approach in the past was dependent upon diagnosing unilateral or localized disease and then performing radical surgery before the disease could become widespread and inoperable. Various radical surgical techniques for genital and renal tuberculosis have been devised in an attempt to reduce the relapse rate and mortality after a 5 year period. Long term studies varying from 3 to 14 years in both genital and renal tuberculosis have shown an overall treatment failure of approximately 50 per cent following operation. These failures include both relapse and death. In isolated reports a 70 to 80 per cent conversion rate was attained with operation alone. However, the latter studies were usually of less than 5 years' duration. All long term studies gave the patient a 50 per cent chance of relapse.

The era of antituberculous drugs has relatively recently come into its own. It is hoped that in future years these drugs, added to judicious surgical intervention, will materially reduce the morbidity in genitourinary tuberculosis. The following discussion is a general review of the literature in an attempt to reiterate the present day thinking concerning the pathogenesis and treatment of genitourinary tuberculosis.

## INCIDENCE AND SITE OF DISEASE

The reported incidence of genitourinary tuberculosis in 15,000 documented cases of tuberculosis of all types was 4 per cent.<sup>2</sup>

*From Valley Forge Army Hospital Phoenixville Pa.*

The over all ratio between males and females of tuberculosis of the urinary tract is approximately 3:1. The predominant age group having genitourinary tuberculosis falls within the third to fifth decade and the peak incidence occurs between the ages of 25 to 30 years, with a significant number of patients contracting the disease at age 50.

There has been a considerable amount of data accumulated relating to the presence of extragenitourinary tuberculosis occurring concomitantly with genitourinary tuberculosis. As will be seen in the following discussion renal tuberculosis always occurs secondarily to a focus of tuberculosis in some other organ. However, there are times when no other evidence of tuberculosis can be discovered other than genitourinary tuberculosis. Varying reports have shown pulmonary tuberculosis to be detectable in 30, 50, and 70 per cent of patients having tuberculosis of the seminal vesicles, prostate and epididymis. Osseous tuberculosis is also relatively frequently associated with genitourinary tuberculosis. From 15 to 24 per cent of patients with genitourinary tuberculosis also have clinical evidence of skeletal tuberculosis.

The question of unilateral or bilateral renal involvement has been debated much and the terms "good" kidney and "unilateral" renal tuberculosis have entered the literature. This subject has been studied extensively by analyzing large numbers of autopsy cases. It is believed from this type of data, that renal tuberculosis is initially bilateral. One may, however, find it necessary to make multiple serial sections of the kidney to demonstrate microscopic foci of tuberculosis. Some workers, in doing routine autopsies on patients who have died of pulmonary tuberculosis with and without signs and symptoms of renal involvement have demonstrated 100 per cent bilateral tuberculosis. It is suggested that the term unilateral renal tuberculosis be used as a clinical expression and should really imply unilateral demonstrable tuberculosis. Not infrequently microscopic foci in the opposite kidney may continue on to healing and scar formation and reach the inactive stage. On the other hand the so-called "good" kidney may demonstrate evidence of tuberculosis within a few years following a nephrectomy.

If a patient has tuberculosis of the genital organs the potentiality of the coexistence of urinary tuberculosis is great. Forty five to 80 per cent of cases of renal tuberculosis are associated with genital tuberculosis. Tuberculosis has been found in the prostate in 95.2 per cent of all patients having genital tuberculosis and the epididymis has been involved in 48.5 per cent. These data speak for themselves and en-

phsimize that in all cases of genital tuberculosis in the male, the prostate is almost always involved, either alone or in combination with the epididymis and seminal vesicles

Tuberculosis in the genital tract of the female is a much more difficult problem because the disease is less apparent. Most data on this subject are of an indirect nature but give some insight into the frequency of occurrence. Data have been available in studying a large group of women who died of pulmonary tuberculosis. Autopsy material reveals that genital tuberculosis has been found in 1 to 30 per cent of these cases. In making a study of sterile women, it has also been indirectly found that 5 to 12 per cent of these women have evidence of endometrial tuberculosis.

#### PATHOGENESIS AND PATHOLOGY<sup>4,5,6</sup>

**Renal Tuberculosis** This is usually a secondary manifestation of tuberculosis elsewhere in the body. It is believed that a tuberculous focus of infection must first exist in an extrarenal site. This site is usually in the lungs, however, osseous tuberculosis may account for a focus of infection leading to subsequent hematogenous infection of the kidneys. In the English literature, tuberculosis of the intestinal tract is given significant importance in this respect. The kidneys are, thus, first infected by the hematogenous route. A bacillemin is produced by the discharge of bacilli into the circulation by erosion of the blood vessel at the site of the extrarenal focus. As a result of the very rich blood supply to the kidneys, these organs are most frequently involved following the bacillemia. The initial lesions are usually bilateral, in the cortex of the kidneys, and frequently occur in proximity to the glomeruli. These small initial cortical lesions may be completely healed by scar formation or become encysted. A small cortical lesion may ulcerate into one of the renal tubules and give rise to bacilluria. Under these circumstances, pyuria may not be present and the only evidence of renal tuberculosis may be the presence of acid fast bacilli on culture of the urine. At this stage, urography will also be normal. The initial lesions in the stago, urography will also be normal. The initial lesions in the cortex may be nodular or miliary, depending on the magnitude of seeding of the kidney from the distant foci. The caseocavitary type of lesion in the kidney is more important from the point of view of making a clinical diagnosis. These latter lesions frequently occur in the renal papillae as a result of spread from cortical lesions. The cortical foci spread either directly or via the lymphatics to the pyramids and give rise to definite lesions in the papillae where necrosis and extension occur. The initial lesion in the renal papillae may consist of one or more tubercles. These tubercles coalesce and extend into the papillary ducts and caseation occurs. From this point, sloughing into the minor calyx eventually occurs and produces

948 bacilluria, pyuria and hematuria. The hematuria may be microscopic or gross, depending on the size of the vessel eroded. There are several factors existing in the kidney which predispose to local spread within the tissue. Direct local spread and spread via the lymphatics have been mentioned. Tuberculous endarteritis or occlusion and thrombosis of an artery produced by the pressure of local tubercles may lead to a localized area of devitalized tissue in the kidney. Such devitalized tissue is a fertile area for the spread of tuberculosis. In addition one of the papillary ducts may be occluded by the process and this would encourage a retrograde growth of the organisms behind the point of obstruction. If there is a considerable amount of vascular thrombosis involving the renal arterioles, the kidney may be converted to a small contracted fibrotic organ.

The tuberculous process having invaded the minor calyx, will next extend to the adjacent major calyx and frequently convert the latter into a tuberculous cavity. The neck of the calyx may be closed and pyuria and bacilluria may no longer be present in the urine. The neck of the calyx may also be open intermittently producing only periodically positive urinoanalyses. This process in the renal calices usually develops slowly. However, it may take several months or several years for a spread to the lower urinary tract to occur. Nevertheless, the pelvis of the kidney and the ureter are the next areas to be affected by the tuberculous process. In the renal pelvis, contraction and ulceration occur. This may cause extensive shrinking of the kidneys due to scar formations. Invasion of the ureters and the submucosa and muscularis. The lesions in the ureters are usually small and result in abundant scar formation which may cause obstruction and further increase in the disease process above the area of obstruction. At times the ureter may be completely closed by stricture and produce what is known as auto-nephrectomy. This results in a small contracted, fibrotic non-functioning kidney containing tuberculous foci of infection.

**Tuberculosis of the Bladder** During the course of renal tuberculosis the urinary bladder sometimes becomes infected. There are several types of involvement in the bladder. Frequently, there are small yellow tubercles of a pale nature with a surrounding angry red areola which occur most commonly about the ureteral orifices in the bladder but are not necessarily always limited to these areas. The yellow tubercles may be absent from the bladder mucosa and the disease may present itself as a patchy red cystitis without tubercles. This is usually seen about the base of the bladder and sometimes on the anterior wall. Less frequently there may be more extensive lesions of the bladder in which the whole thickness of the bladder wall is involved without the presence of visible tubercles. There is usually a

progressive ulceration. This type of lesion has been described in the literature as localized panmural tuberculous cystitis.<sup>\*</sup> It is seen as a localized, granulomatous, fungating lesion involving the anterior wall of the bladder and usually about the size of a half dollar. This type of lesion tends to be more refractory to treatment. It is prone not to heal following nephrectomy as do other simpler lesions of a patchy or nodular nature involving the mucosa and submucosa. With panmural tuberculous involvement, the remaining bladder may look entirely normal and subtotal cystectomy appears to be the only successful means of curing this type of lesion.

**Genital Tuberculosis.** In the male, genital tuberculosis is thought always to occur secondary to urinary tuberculosis. Primary hematogenous tuberculous seeding of the genital organs in the male has theoretical possibilities but all indications strongly suggest that genital tuberculosis is most always secondary to urinary tuberculosis. The urinary tuberculosis may, however, as stated before, be in the form of asymptomatic renal disease manifested only by bacilluria with or without pyuria. As has been stated, over 95 per cent of patients with genital tuberculosis have involvement of the prostate.<sup>\*</sup> The prostate may contain firm nodules or be enlarged with soft caseous foci. Following prostatic involvement from the urinary tract, the infection may be spread via the ejaculatory duct to the seminal vesicles and to the vas deferens. Involvement of the seminal vesicles and vasa may be in the nature of tubal thickening or a nodular type of beading. By extension of this same process the epididymis becomes involved. The most frequent site of involvement is the tail of the epididymis which may be enlarged and swollen. As the disease progresses, it may become soft and caseous and involve the entire testicle. The process may eventually extend to the scrotum, thus involving the whole area in a caseous mass which may rupture exteriorly forming a fistulous tract.

Genital tuberculosis in the female differs in pathogenesis and pathology, primarily because of anatomic differences. In the male, genital tuberculosis is believed to be a descending infection from an infection higher in the urinary tract, originating in the kidneys. Ascending infections from the lower urinary tract or genital organs to the kidney is believed to be unlikely in the male. Similarly, retrograde infection is not believed to occur in the female, that is, tuberculosis of the external genitalia is not likely to spread in a retrograde fashion to the pelvic organs. Conversely, urinary tuberculosis in the female is thought to be an unlikely cause of tuberculous involvement of the uterus, tubes, and ovaries. Female genital tuberculosis involving these organs is therefore a result of hematogenous dissemination. Genital tuberculosis in the female may also be secondary to generalized peritoneal and pelvic tuberculosis. This type of tuberculosis

bacilluria, pyuria, and hematuria. The hematuria may be microscopic or gross, depending on the size of the vessel eroded. There are several factors existing in the kidney which predispose to local spread within the tissue. Direct local spread and spread via the lymphatics have been mentioned. Tuberculous endarteritis or occlusion and thrombosis of an artery produced by the pressure of local tubercles may lead to a localized area of devitalized tissue in the kidney. Such devitalized tissue is a fertile area for the spread of tuberculosis. In addition, one of the papillary ducts may be occluded by the process and this would encourage a retrograde growth of the organisms behind the point of obstruction. If there is a considerable amount of vascular thrombosis involving the renal arterioles, the kidney may be converted to a small contracted fibrotic organ.

The tuberculous process, having invaded the minor calyx, will next extend to the adjacent major calyx and frequently convert the latter into a tuberculous cavity. The neck of the calyx may be closed and pyuria and bacilluria may no longer be present in the urine. The neck of the calyx may also be open intermittently, producing only periodically positive urine analyses. This process in the renal calices usually develops slowly. However, it may take several months or several years for a spread to the lower urinary tract to occur. Nevertheless the pelvis of the kidney and the ureter are the next areas to be affected by the tuberculous process. In the renal pelvis contraction and ulceration occur. This may cause extensive shrinking of the kidneys due to scar formations. Invasion of the pelvis and ureters occurs at first in the mucosa and then involves the submucosa and muscularis. The lesions in the ureters are usually small and result in abundant scar formation which may cause obstruction and further increase in the disease process above the area of obstruction. At times the ureter may be completely closed by stricture and produce what is known as auto-nephrectomy. This results in a small, contracted, fibrotic, non-functioning kidney containing tuberculous foci of infection.

**Tuberculosis of the Bladder.** During the course of renal tuberculosis the urinary bladder sometimes becomes infected. There are several types of involvement in the bladder. Frequently, there are small yellow tubercles of a pale nature with a surrounding angry red areola which occur most commonly about the ureteral orifices in the bladder, but are not necessarily always limited to these areas. The yellow tubercles may be absent from the bladder mucosa and the disease may present itself as a patchy red cystitis without tubercles. This is usually seen about the base of the bladder and sometimes on the anterior wall. Less frequently, there may be more extensive lesions of the bladder in which the whole thickness of the bladder wall is involved without the presence of visible tubercles. There is usually a

Symptoms of genital tuberculosis in the male depend on the extent and location of the disease. In prostatic involvement, symptoms may be absent and discovery may depend entirely on physical examination. However, there may be dysuria or obstruction to the urinary flow by compression of the urethra or involvement of the urethra by the tuberculous process.<sup>11</sup> On rare occasions, stricture of the posterior urethra occurs, which can give rise to all the symptoms associated with benign prostatic hypertrophy and urinary retention. Symptoms of tuberculous involvement of the seminal vessels and the vas deferens may not be present. Involvement of the epididymis, however, may produce acute symptoms with pain and swelling, or there may be no symptoms whatsoever. The first indication of disease in the area may be the rupture of a caseous area through the scrotal skin causing discharge of caseous material following slight trauma.<sup>12</sup>

In female genital tuberculosis, symptoms have a tendency to be lacking. Any female, however, with symptoms of salpingitis who is virgin or who is free from venereal disease or postabortive infection should be strongly suspected of having genital tuberculosis. Amenorrhea may be present, but, of course, there are many other conditions that may produce this symptom.<sup>7</sup>

#### PHYSICAL SIGNS

In renal tuberculosis, physical signs are usually absent. The tuberculous kidney may not be palpable or tender.<sup>4</sup> Only on rare occasions may the kidney be enlarged to the extent that it may be palpable and slightly tender. Involvement of the prostate and seminal vesicles by tuberculosis may be manifested by swelling, tenderness, nodules, softening, or fluctuation. In the acute form of tuberculosis of the epididymis, there may be a tender swelling in the tail of the epididymis, usually with sparing of the testicle. The vasa may also be tender. There is not infrequently an associated hydrocele. As the process gets older there develops a firm or soft, perhaps even fluctuant or "doughy," swelling in the tail of the epididymis. With long standing disease of a more extensive nature, the testes may be involved in this swollen mass. Beadlike sclerosis may be present in the vasa. Involvement of the epididymis, vasa, or seminal vesicles on one side may also be associated with tuberculous infection on the contralateral side, even though this may be difficult to discover clinically.<sup>5, 6</sup>

Diagnosis of pelvic tuberculosis in the female is extremely difficult without definite symptoms and palpable lesions. In most patients with palpable abnormalities in the pelvis, the diagnosis is made only after pathologic study.<sup>7</sup> It is frequently not suspected when there is no other evidence of tuberculosis in the body. Even in the presence of extragenital tuberculosis, palpable pelvic masses or abnormalities may lead to the suspicion



will not be considered in this discussion inasmuch as it is a complication of generalized tuberculosis of the pelvis and peritoneum. The fallopian tubes are most frequently involved first in the "seeding" from a distant focus of tuberculosis. Initial involvement of the tubes is sometimes indistinguishable from recurrent gonorrheal infection, even at the time of surgery. The tubal tissue involved is characterized by its pallor. There is a tendency to marked thickening and induration of the fallopian tubes. Calcification is not infrequent. In approximately half of the cases, the fimbriated end of the tubes may be opened, and at the time of examination, caseous material may be expressed from the lumen. Within the mucosa of the tubes, there may be hyperplasia and thickening with tubercle formation and ulceration. From the tubes, the process is believed to extend in both directions to the uterus and to the ovaries. The uterus itself may rarely be involved initially. The chief involvement is in the endometrium. Tubercles are present but are usually small and difficult to recognize except at microscopic examination. The disease in the endometrium is characterized by ulcerations and caseous lesions. At times multiple tubercles may be the chief lesions. When the ovaries are involved, tubal ovarian abscess is seen which is not prone to spontaneous healing. The cervix is frequently spared but may be involved in approximately 5 per cent of cases of genital tuberculosis in the female. Cervical tuberculosis is usually associated with involvement of the tubes and uterus. It may have a papillary form presenting a cauliflowerlike growth which may grossly be in the form of carcinoma. Tuberculosis of the external female genitalia, the vulva and vagina, are the most infrequent site of tuberculosis of the skin and there is a great tendency to papillary growth and ulceration which may be related to the presence of more moisture in this area.

### SYMPTOMS

Urinary tuberculosis may produce no symptoms. Pyuria and bacilluria may be the only indications of a lesion. When symptoms are present, urgency and frequency of urination resulting from tuberculous cystitis secondary to renal tuberculosis is frequently noted. True renal colic may be encountered which is due to the passage of caseous material, blood clots or bits of discharged calcified material into the ureter. A dull constant nagging flank pain over the affected kidney is a frequently described symptom which is thought to be secondary to hydro-nephrosis produced by ureteral stricture. The patient may occasionally complain of gross hematuria as a result of the tuberculous process eroding a medium sized vessel. On rare occasions the picture of acute pyelonephritis or acute pyelitis may be produced including acute pain, chills and fever.<sup>10</sup>

disease. On certain occasions a sominal vesiculogram may be performed.

In female genital tuberculosis, laboratory or diagnostic procedures are limited to three major steps (1) Dilation of the cervix with curettage of the uterine endometrium may be performed in order to obtain a biopsy and material for culture. This material may also be used for guinea pig inoculation. (2) Menstrual blood may also be cultured. Some authors advocate this procedure as a routine in all female patients with pulmonary tuberculosis. The feasibility of such a wide scale study, however, has its limitations. (3) Culdosecopy grants direct visualization and, under special circumstances, may lead one to suspect pelvic tuberculosis. Culdosecopy may be of particular importance in the follow up study of patients with known pelvic tuberculosis following long term adequate therapy.

### THERAPY

Prior to the streptomycin sulfate (SM) era, therapy for genitourinary tuberculosis was limited to surgical intervention for all resectable lesions and conservative and sanatorium care for nonoperable lesions. For unilateral caseous tuberculosis of the kidney, nephrectomy was performed. For bilateral renal tuberculosis, conservative therapy was used and the prognosis was always poor. Even with nephrectomy for unilateral disease, there were only slightly more than 50 per cent of patients alive five years after nephrectomy. Genital tuberculosis, likewise, was treated by radical surgical resection when feasible. The introduction of SM and other allied drugs to the treatment of genitourinary tuberculosis added a new light and a new hope to this hitherto fore unfavorable disease. Up until 1950, the use of SM was recognized as an excellent adjunct to genitourinary surgery.<sup>23</sup> It limited the formation of fistulas following surgery, and permitted the use of localized resection rather than nephrectomy.<sup>14-16</sup>

Between 1950 and 1952, the response of genitourinary tuberculosis to many combinations of dosage of SM and para-aminosalicylic acid (PAS) given for periods of three to four months were studied.<sup>17-21</sup> These studies indicated that minimal lesions all responded well initially, but that advanced lesions responded poorly. The recommendation at this time was to resect all lesions that were greater than minimal.

In 1952, Lattimer and his group<sup>14</sup> emphasized that 55 per cent or more of patients developed relapses within two years, when given short courses of SM and PAS, and proposed that treatment be continued for from one to three years. Minimal lesions were treated with drug therapy alone, but the tendency to treat all lesions other than minimal renal lesions with drugs plus surgery still remained.

of genital tuberculosis, but its diagnosis will usually depend on laboratory data, operative specimens or perhaps culdoscopy

### DIAGNOSTIC PROCEDURES

Routine urinalyses should be performed with particular attention to the presence of pyuria, hematuria, and albuminuria. The presence of pus cells in the urine is the most frequent abnormality. Hematuria is not infrequent and is usually microscopic. The occurrence of gross hematuria depends on the size of the vessel eroded by the tuberculous focus. Albuminuria is not usually seen until the disease becomes more advanced. A search for tubercle bacilli should be made on a stained smear of concentrated sediment, by culture, and guinea pig inoculation. It is to be remembered that the only laboratory finding of renal tuberculosis may be the presence of bacilluria. Pyelography, both excretory and retrograde, is one of the major procedures used in the clinical diagnosis of renal tuberculosis. There has been much discussion about the advantages of either method. Some authors state that the excretory pyelogram is usually not as completely satisfactory as the more complete filling obtained with the retrograde pyelogram. However, no dogmatic statement should be made and both methods should be utilized in each patient. An excretory pyelogram will give one an indication of the function of each kidney and may be followed by retrograde pyelography for a more complete study after a relatively good indication of the extent of the disease has been obtained. Lattimer and associates<sup>10</sup> classified renal tuberculosis into five main groups, according to the abnormalities seen on the pyelogram. They designate group 0 as renal tuberculosis manifested only by the presence of bacilli in the urine and with negative pyelographic findings. Grade 1 demonstrates only slight pyelographic abnormalities plus bacilluria. Grade 2 must have definite changes on the pyelogram consistent with tuberculosis involving one calyx plus bacilluria. Grade 3 has exactly the same criteria except that the pyelogram must show involvement of two calices. Grade 4 must show three or more calices involved on the pyelogram. Hydronephrosis, secondary to tuberculosis and specifically secondary to urethral stricture, is classified separately.

Cystoscopy should be performed in all cases of proven renal tuberculosis. Separate urine specimens should be taken from each ureter and from the bladder for microscopic examination and for a search for bacilli. In male genital tuberculosis, laboratory procedures are for all practical purposes, limited to the examination of the urine for the presence of tubercle bacilli. Some authors advocate prostatic massage to collect samples for cultural studies. Others, however, believe that this process is unwise because of the possibility of dissemination of the

disease. On certain occasions a seminal vesiculogram may be performed.

In female genital tuberculosis, laboratory or diagnostic procedures are limited to three major steps: (1) Dilatation of the cervix with curetting of the uterine endometrium may be performed in order to obtain a biopsy and material for culture. This material may also be used for guinea pig inoculation. (2) Menstrual blood may also be cultured. Some authors advocate this procedure as a routine in all female patients with pulmonary tuberculosis. The feasibility of such a wide serologic study, however, has its limitations. (3) Culdoscopy grants direct visualization and, under special circumstances, may lead one to suspect pelvic tuberculosis. Culdoscopy may be of particular importance in the follow-up study of patients with known pelvic tuberculosis following long-term adequate therapy.

### THERAPY

Prior to the streptomycin sulfate (SM) era, therapy for genital tuberculosis was limited to surgical intervention for all resectable lesions and conservative and sanatorium care for nonoperable lesions. For unilateral encysted tuberculosis of the kidney, nephrectomy was performed. For bilateral renal tuberculosis, conservative therapy was used and the prognosis was always poor. Even with nephrectomy for unilateral disease, there were only slightly more than 50 per cent of patients alive five years after nephrectomy. Genital tuberculosis, likewise, was treated by radical surgical resection when feasible. The introduction of SM and other allied drugs to the treatment of genital tuberculosis added a new light and a new hope to this hitherto unfavorable disease. Up until 1950, the use of SM was recognized as an excellent adjunct to genitourinary surgery.<sup>13</sup> It limited the formation of fistulas following surgery, and permitted the use of localized resection rather than nephrectomy.<sup>14-16</sup>

Between 1950 and 1952, the response of genitourinary tuberculosis to many combinations of dosage of SM and para-aminosalicylic acid (PAS) given for periods of three to four months were studied.<sup>17-21</sup> These studies indicated that minimal lesions all responded well initially, but that advanced lesions responded poorly. The recommendation at this time was to resect all lesions that were greater than minimal.

In 1952, Lattimer and his group<sup>22</sup> emphasized that 55 per cent or more of patients developed relapses within two years, when given short courses of SM and PAS, and proposed that treatment be continued for from one to three years. Minimal lesions were treated with drug therapy alone, but the tendency to treat all lesions other than minimal renal lesions with drugs plus surgery still remained.

of genital tuberculosis, but its diagnosis will usually depend on laboratory data, operative specimens, or perhaps culdoscopy

### DIAGNOSTIC PROCEDURES

Routine urinalyses should be performed with particular attention to the presence of pyuria, hematuria and albuminuria. The presence of pus cells in the urine is the most frequent abnormality. Hematuria is not infrequent and is usually microscopic. The occurrence of gross hematuria depends on the size of the vesicle eroded by the tuberculous focus. Albuminuria is not unusual until the disease becomes more advanced. A search for tubercle bacilli should be made on a stained smear of concentrated sediment by culture, and guinea pig inoculation. It is to be remembered that the only laboratory finding of renal tuberculosis may be the presence of bacilluria. Pyelography, both excretory and retrograde, is one of the major procedures used in the clinical diagnosis of renal tuberculosis. There has been much discussion about the advantages of either method. Some authors state that the excretory pyelogram is usually not as completely satisfactory as the more complete filling obtained with the retrograde pyelogram. However, no dogmatic statement should be made and both methods should be utilized in each patient. An excretory pyelogram will give one an indication of the function of each kidney and may be followed by retrograde pyelography for a more complete study after a relatively good indication of the extent of the disease has been obtained. Lattimer and associates<sup>10</sup> classified renal tuberculosis into five main groups according to the abnormalities seen on the pyelogram. They designate group 0 as renal tuberculosis manifested only by the presence of bacilli in the urine and negative pyelographic findings plus bacilluria. Grade 1 must have definite changes on the pyelogram consistent with tuberculosis involving one calyx plus bacilluria. Grade 2 has exactly the same criteria except that the pyelogram must show involvement of two calices. Grade 3 must show three or more calices involved on the pyelogram. Pyelonephrosis secondary to tuberculosis and specifically secondary to urethral stricture, is classified separately.

Cystoscopy should be performed in all cases of proven renal tuberculosis. Separate urine specimens should be taken from each ureter and from the bladder for microscopic examination and for a search for bacilli. In male genital tuberculosis, laboratory procedures are for all practical purposes limited to the examination of the urine for the presence of tubercle bacilli. Some authors advocate prostatic massage to collect samples for cultural studies. Others however, believe that this process is unwise because of the possibility of dissemination of the

may be made, however, to summarize the present treatment of genitourinary tuberculosis. Surgical intervention should not be performed in genitourinary tuberculosis in the presence of active or unstabilized extragenital tuberculosis. An effort should be made first to control and arrest the extragenital focus. The genitourinary tract should be re-evaluated then, in reference to the indications of therapy. By doing this, one will be able to derive knowledge by observing the response of the genital and extragenital focus under chemotherapy. In the absence of extragenital foci or in the presence of inactive extragenital foci, minimal lesions in the genitourinary tract may be treated with chemotherapy alone. Lesions other than minimal in nature have until recently seemed to require surgical intervention. However, there seems to be some indication that many moderately advanced and some far advanced lesions may respond satisfactorily to long term chemotherapy.

The present accepted drug regimen in genitourinary tuberculosis consists of 1 gram of SM every third day, 300 mg of INH daily, and 12 grams of PAS daily. Upon the recommendations of Doctor Lattimer, this therapy offers the best results to date when continued for at least 24 months. Patients with minimal renal lesions and normal findings on pyelography have had rapid clinical and bacteriologic reversal and have done well on only 1 year of this regimen. Recent reports<sup>24</sup> suggest that, in addition to PAS, INH in doses of 16 mg per kilo per day (with from 50 to 100 mg of pyrazinone), and SM daily for at least 3 months may further improve the chemotherapeutic results in tuberculosis.

#### SUMMARY

Genitourinary tuberculosis is a frequent extrapulmonary site of tuberculous infection. *Mycobacterium tuberculosis* may be disseminated via the blood stream from a primary extragenital focus and trapped by the richly vascular kidneys. Secondary foci of infection may then spread in a retrograde fashion to the genital organ. Tuberculous infection of the renal and genital organs of the female occurs by the hematogenous route.

Before and after the chemotherapeutic era and up to 1956, surgical resection was instrumental in all forms of treatment of genitourinary tuberculosis except minimal lesions. Present-day experience indicates that the pendulum may be swinging away from radical surgical excision. Two years of triple drug therapy (streptomycin sulfate, isoniazid, and para-aminosalicylic acid) without surgical intervention, are advocated for most genitourinary tuberculous lesions that show a response to therapy. Many patients with far advanced lesions may do better than previously suspected on long term drug therapy alone. Operative procedures should be reserved for those with the more advanced stages of the disease and based upon individual case circumstances.

## REFERENCES

- 1 Ljunggren E. Prognosis of renal tuberculosis treated by nephrectomy. *J Urol* 67: 129-131 Feb 1952
- 2 Lattimer J K, Kohn R, Lock F, Kenney M and Ambrose J B. Genito-urinary tuberculosis. In *Transactions of the 13th Conference on the Chemotherapy of Tuberculosis* St. Louis Mo. Feb 8-11 1954 by the Veterans Administration and the Army and Navy with the cooperation of the National Tuberculosis Association. pp 383-389
- 3 Amberson J B. Tuberculosis of urinary tract and tuberculosis of genital tract. In Cecil R L and Loeb R F (editors) *Textbook of Medicine* 8th ed. W B Saunders Co. Philadelphia Pa. 1951 pp 297-299
- 4 Williams L. Renal tuberculosis. *Grand Rounds Veterans Administration Hospital Minneapolis* 7: 229-243 Dec 7 1951
- 5 Jones R F (Washington D C). Genital tuberculosis in male concept of its pathogenesis and treatment. *J Urol* 66: 778-791 Dec 1951
- 6 Greenberger A J and Greenberg M E. Urogenital tuberculosis in male concept of its pathogenesis and treatment. *J Urol* 67: 222-231 Feb 1952
- 7 Jenson E M. Modern treatment of tuberculosis and the syndromes of the male genital tract. *Obst & Gynec* 66: 1131-1139 Nov 1953
- 8 Birtwhistle W M. Renal tuberculosis. *Edinburgh* 4: 59-583-590 Dec 1952
- 9 Sargent J C. Localized perinephric tuberculosis cystitis. Report of 2 cases treated by subtotal cystectomy. *J Urol* 70: 207-215 Aug 1953
- 10 Lattimer J K (Chicago) and Graf E C. Tuberculosis in obstructive pyelitis and associated infections. *J Urol* 69: 745-752 June 1953
- 11 Baker W J. Use of streptomycin in treatment of renal tuberculosis. *J Urol* 66: 254-262 Aug 1951
- 12 Rink J R. Use of streptomycin in treatment of renal tuberculosis. *J Urol* 66: 242-253 Aug 1950
- 13 Scardin P L, Kelly R A and Scott W W. Seminal tract tuberculosis. A radical operation for radical treatment of tuberculosis. *J Urol* 63: 699-711 Apr 1950
- 14 Lattimer J K, Hertzberg A, Harp J J, Berman M, Brundage D and Venema R. Streptomycin and PAS treatment of genito-urinary tuberculosis. *J Urol* 67: 750-756 May 1952
- 15 Rink J R. Surgical treatment of tuberculous kidney. *J Urol* 66: 498-499 Oct 1951
- 16 Lattimer J K. Pyelonephrectomy for tuberculous kidney. *South African M J* 74: 749 Dec 1952
- 17 Marks C (East London). Management of renal tuberculosis. *South African M J* 74: 325-326 Apr 18, 1953
- 18 Galbraith W W. Treatment of tuberculosis of urinary tract. *Brit M J* 2: 953-955 Nov 1 1952
- 19 Setd H F, Ellis F H, Aldummo B P. Treatment of male genital tuberculosis with streptomycin and para-aminosalicylic acid. *Am J Obst & Gynec* 66: 823-829 Oct 1953
- 20 Nesbitt R M and Thulby R L. Results of streptomycin therapy in urinary tuberculosis. A year review. *J Urol* 68: 394-398, July 1952
- 21 Edmann G, Shargel G and Luvik H. Radical prostatectomy for tuberculosis. *J Urol* 68: 523-531 Aug 1952
- 22 Lattimer J K. Genito-urinary tuberculosis. In *Transactions of the 14th Conference on the Chemotherapy of Tuberculosis* Atlanta Ga. Feb 7-10 1955 by the Veterans Administration, Army and Navy with the cooperation of the National Tuberculosis Association. pp 152-157
- 23 Lattimer J K, Weschler H, Whitel G and Boy T. Genito-urinary tuberculosis. In *Transactions of the 15th Conference on the Chemotherapy of Tuberculosis* St. Louis Mo. Feb 6-9 1956 by the Veterans Administration, Army and Navy with the cooperation of the National Tuberculosis Association. pp 152-157
- 24 Transactions of the 16th Veterans Administration Armed Forces Conference on the Chemotherapy of Tuberculosis. St. Louis Mo. Feb 11-14 1957

# TUBERCULIN SENSITIVITY AMONG ARMY CHILDREN

THOMAS A. HANSON, *Captain MC USA*

MERCEDES FISCHER *Major ANC USA*

THE SUCCESS of the newer drugs and surgical methods in decreasing tuberculosis in the United States should bring new emphasis on the tuberculin skin test for detecting infections in children. Myers and associates<sup>1</sup> demonstrated that in Minnesota the incidence of positive reactors among school children has gradually declined from 70 per cent in 1916 to 4 per cent in 1956. This is typical of the trend throughout the country.

It was our impression that tuberculosis is more prevalent in dependent children of Army personnel than in the general population. To test the validity of this idea and elucidate the factors which might account for such a difference, a survey study employing the tuberculin skin test was carried out in the spring of 1956 at Fort Lewis, a typical Army post located in western Washington.

## MATERIAL AND METHOD

In March 1956 a questionnaire requesting parental consent to tuberculin testing was given to 1,245 school children, aged 5 to 14 years, at the Fort Lewis and Dupont district schools. The children selected for study were all military dependents. One child who had been vaccinated with BCG was not included. A preliminary education program was presented at a Parent Teachers Association meeting with assistance from the Pierce County Tuberculosis Association, and was responsible in part for the excellent response. Only 39 declined the test. Many slips were not returned, and 49 agreed to the test but were either absent during the reading period or transferred before the program was in progress. A total of 1,041 dependent children of Army personnel were tested.

A short history was taken for each child, to determine any who had had known or suspected exposure to tuberculosis or

---

From Madigan Army Hospital, Tacoma, Wash., and Post Surgeon Dispensary, Fort Lewis, Wash.





in a per cent positive of 8.5 as compared with 7.3 for the "United States only" group (table 3). The slightly increased incidence of tuberculin sensitivity among American born Army children who have lived in other countries is not significant and could well be due to chance alone or to inaccuracies in the biographical data submitted by the parents.

TABLE 1 *Results of tuberculin skin tests on 1 041 dependent children of Army personnel*

School grade	Number tested	Positive reactors		Negative reactors	
		Number	Per cent	Number	Per cent
Kindergarten	145	11	7.6	134	92.4
First	146	6	4.1	140	95.9
Second	176	13	7.4	163	92.6
Third	148	7	4.7	141	95.3
Fourth	107	10	9.3	97	90.7
Fifth	71	6	8.5	65	91.5
Sixth	78	14	17.9	64	82.1
Seventh	74	14	18.9	60	81.1
Eighth	54	9	16.7	45	83.3
Ninth	42	14	33.3	28	66.7
Total	1 041	104		937	

TABLE 2 *Results of tuberculin skin tests tabulated according to whether or not subjects had lived overseas*

	Positive reactors		Negative reactors		Total number
	Number	Per cent	Number	Per cent	
United States only	29	7.3	367	92.7	396
Overseas	75	11.6	570	88.4	645
Total	104		937		1 041

Includes native born children from Panama, Philippine Islands, and Puerto Rico.

The survey was responsible for the detection of 1 new case of active, moderately advanced, pulmonary tuberculosis in a parent. There were 6 instances of healed calcified foci in adults and children, and 1 case of presumably arrested, minimal, pulmonary tuberculosis in a child, age 9. In 4 children there was a clear cut association with tuberculosis in a relative. In 2 cases

families living in Japan had discovered servants with pulmonary tuberculosis. Multiple positive reactors were found in 11 families accounting for 25 cases. Twenty-one of the latter came from 9 families native to Panama, Puerto Rico, and the Philippine Islands. These 9 families contributed 20 per cent to the total group of sensitized children.

TABLE 3 Results of tuberculin skin tests tabulated according to whether or not subjects had lived overseas

	Positive reactors		Negative reactors		Total number
	Number	Per cent	Number	Per cent	
United States only	29	7.3	367	97.7	396
Overseas	49	8.5	530	91.5	579
Total	78		897		975

Excludes native-born children from Panama, Philippine Islands, and Puerto Rico

### DISCUSSION

The declining rate of positive reactors in children seems to indicate that fewer children are being exposed to tuberculosis than formerly. Because of this it becomes even more important and productive to seek out those individuals who are tuberculin positive not only to find active cases but also so that this small group can be carefully observed throughout the years to come for earliest signs of reactivation. To emphasize the usefulness of early detection Myers and associates stated, "Periodic examination at least annually will permit diagnosis of 95 per cent of evolving chronic pulmonary lesions while they are minimal, before they produce symptoms and usually before they are contagious." Furthermore it is possible that drug therapy will be found of value in early treatment of recent converts even though no evidence for progressive disease exists. This question is now being debated.<sup>2, 3</sup>

Intradermal tuberculin testing on civilian school children has demonstrated varying rates of sensitivity depending on ages of subjects tested and locality in which the tests were done. In Kansas City the rate ranged from 1.3 to 3.1 per cent in kindergarten classes depending on the sector of the city—the lower rates being in the better housing and higher income areas.<sup>4</sup> In New York City large numbers of high school children have been tested and show an exposure rate of from 5.7 per cent in the 13 year old group to 19.4 per cent in the 17 year old group.<sup>5</sup> This is considerably lower than the rates in our 11 to 14 year-old subjects.

In Pittsburgh the rate for 537 children, ages 1 to 16, consecutively hospitalized at the University of Pittsburgh and Children's Hospital during parts of 1950 and 1951, was 0.6 per cent. Our rural Minnesota counties, testing during 1946 and 1947, demonstrated a low rate of 2.7 per cent in children of ages 6 through 14. This group compares closely to ours in age spread, but its rate of tuberculin sensitivity is much lower than our rate of 10 per cent.

Certain types of information obtainable from studies such as this may be of value in answering questions regarding changing public health problems with tuberculosis. There is a need to know just what proportion of our school children are not being protected, what areas show the greatest exposure rates, and what is the cost involved in case finding through skin testing and mass chest surveying programs.

In a population of Army personnel and their families, which is largely proscreened by frequent physical examinations, the now case rate for tuberculosis would be expected to be low, as was true in our study. We have, however, demonstrated that dependent children who come to the United States as native born Filipinos, Puerto Ricans, or Panamanians represent a group where the positive reactor rate is disproportionately high (26, or 33.4 per cent, of an estimated total of 66 subjects). This group, along with other previously infected children, represents a reservoir of possible focus of infection if the disease evolves into open lesion tuberculosis. Physicians concerned with the health of dependents should intensify their efforts to control tuberculosis through frequent use of skin testing programs with long term follow up and parent education regarding the need for periodic roentgenographic examination of the chest of previously infected children.

#### SUMMARY

One thousand and forty one dependent school children of Army personnel stationed at Fort Lewis, Wash., were screened for tuberculin sensitivity by skin testing. The rate of positive reactors was 10.0 per cent, which is higher than in comparable civilian groups reported by others.

Of the children who had been overseas, 11.6 per cent had positive reactions as compared with 7.3 per cent for those who had lived only in the United States; however, 66 native-born children from Puerto Rico, Panama and the Philippine Islands accounted for 23 per cent of the positive reaction.

The ~~screen~~ was responsible for the detection of one new case of pulmonary tuberculosis in a parent.

**ACKNOWLEDGMENT** The tuberculin used in this study was supplied by the National Tuberculosis Association of Pierce County Wash.

#### REFERENCES

- 1 Myr J A, Gurlanson F G, Meyerding E. A. and Roberts J. Importance of tuberculin testing of school children—28 year study. *J. A. M. A.* 159: 183-190 Sept. 17, 1935.
- 2 Waring J. J. Current treatment of pulmonary tuberculosis. *Dis. Chest* 25: 361-373 Apr. 1954.
- 3 Hsu, K. H. A. Should primary tuberculosis in children continue to be neglected? *J. Pediatr.* 48: 501-519 Apr. 1956.
- 4 Wood L. E. and Mantz H. L. Tuberculin b. staplasmin conversion test in Kansas City as indication of prevalence of infection—preliminary report tuberculin studies. *Am. Rev. Tuberc.* 69: 227-233 Feb. 1954.
- 5 Rubin A. B., Abel S. H., Aronsohn W. H., Glus R., Goldberg S. I., Kosterwitz H., Levine I. and Schwartz S. Tuberculin testing studies in New York City. *Am. Rev. Tuberc.* 69: 1057-1058 June 1954.
- 6 Carpenter A. M., Spino P. D. and Hadden J. C. Incidence of skin-test reaction among children in Pittsburgh District tuberculosis. *A. M. A. Am. J. Dis. Child.* 83: 599-602 May 1952.
- 7 Jordan L. S. Eradication of tuberculosis in rural areas. *J. Missouri M. A.* 45: 803-806 Nov. 1949.

# TREATING TUBERCULOSIS IN A MILITARY HOSPITAL

RICHARD M. BURKE, Lieutenant Colonel, U.S. Army  
JAMES A. WIER, Colonel, U.S. Army

**T**HE INTRODUCTION of specific drug treatment brought a new era from which a new treatment is emerging. A review of the management of a large tuberculosis service should reflect the management now evolving. With this in mind, the tuberculosis section of this hospital for the past few years has been studied. Some of these have been previously briefly presented elsewhere. This material will be presented as to the therapy and differences between military and treatment of tuberculosis.

This hospital treats three groups of patients: (1) military personnel (Army and Navy), (2) dependents of military personnel, and (3) beneficiaries of the Veterans Administration. The military patients are largely young men with recent disease. The civilian dependents are mainly wives of service men, about a third of whom are foreign born. All stages of the disease are represented in the Veterans Administration patients. There are older individuals with advanced, long standing disease.

During 1955, 932 patients were discharged from the tuberculosis section. Of these, 100 per cent were found to be nontuberculous and 50 per cent had inactive tuberculosis, while 79.6 per cent were considered to have active disease. Of the patients with active tuberculosis, 69.9 per cent had pulmonary disease, 5.9 per cent had pleural effusion alone, and 4.2 per cent had extrapulmonary tuberculosis. In those with active pulmonary tuberculosis, the disease was minimal in 27.8 per cent and far advanced in 23.2 per cent as compared with 18.5 per cent minimal and 30.1 per cent far advanced in 1952 (table 1).

The disposition of the patients is shown in table 2. Of the military patients, 46.8 per cent were transferred to Veterans

From Fitzsimons Army Hospital, Denver, Colorado. Dr. Burke is now Director, Division of Tuberculosis Control, State Department of Health, Oklahoma City, Oklahoma.

Administration hospitals to continue treatment, while the remainder with a few exceptions, were treated at this hospital until maximum results were obtained. Irregular discharges of

TABLE 1 Distribution by type of disease of patients discharged from the tuberculosis section 1952 and 1955

Diagnosis	1952		1955	
	Number of patients	Per cent	Number of patients	Per cent
Total	1 423	100 0	932	100 0
No tuberculosis	239	16 8	142	15 2
Inactive tuberculosis	87	6 1	48	5 2
Active tuberculosis	1 097	77 1	742	79 6
Active tuberculosis	1 097	100 0	742	100 0
Pulmonary	946	86 2	667	89 9
Pleural effusion only	115	10 5	44	5 9
Extrapulmonary	36	3 3	31	4 2
Active pulmonary tuberculosis	946	100 0	677	100 0
Minimal	175	18 5	188	27 8
Moderately advanced	486	51 4	332	49 0
Far advanced	285	30 1	157	23 2

TABLE 2 Discharge of patients with active tuberculosis 1952 and 1955

Type of position	Type of disease								Classification			
	Military				Veterans				1952		1955	
	1952		1955		1952		1955		Number	Per cent	Number	Per cent
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent				
Total	670	100 0	415	100 0	327	100 0	447	100 0	150	100 0	25	100 0
Discharge with maximum benefit	385	61 8	219	52 8	99	30 3	59	40 1	83	55 3	187	82 0
Partial benefit	12	1 9	1	0 2	179	54 7	45	30 6	40	26 7	20	8 8
Irregular discharge	5	0 8	1	0 2	25	8 6	13	8 9	2	1 3	3	1 3
Death												
Transferred to other hospital and continued discharge	220	35 5	194	46 8	21	6 4	30	20 4	25	16 7	18	7 9

military patients (those in which the patient leaves against medical advice with inadequately treated active disease) were in

significant because of Army disciplinary powers. This is in sharp contrast to the Veterans Administration patients in this hospital, with an irregular discharge rate of 30.6 per cent, and to the average rate for irregular discharges of tuberculosis patients in Veterans Administration hospitals throughout the United States of about 40 per cent. The civilian dependent irregular discharge rate was 8.8 per cent, and those discharged with maximum hospital benefit reached 82.0 per cent as compared with 55.3 per cent in 1952.

### TREATMENT

**Hospitalization** The criterion for approved discharge is negative sputum, cavity closure, and roentgenographic stability for from four to six months. The time required to achieve this goal averaged 12 months for those with minimal disease, 15 months for those with moderately advanced disease, and 15 plus months for those with far advanced disease.

Available data for 1955 show a reduction in the period of hospitalization because of changes in policy. For example, military patients are now allowed to complete the last three to six months of their prescribed drug therapy while on convalescent leave, rather than remain under hospital supervision for this phase of the treatment. Nonmilitary patients are allowed to return home when conditions are suitable, once their sputum is negative for *Mycobacterium tuberculosis* and a noncavitary pulmonary lesion is stable in serial roentgenograms for at least three months.

The amount of physical activity allowed while awaiting stability of the disease is slowly being modified. The trend has been toward less bed rest, but as yet there has been no radical change in policy. Of great interest is a project started at this hospital in July 1954. It is a study designed to compare at random patients following the conventional rest program with patients on an in-hospital ambulant program. Patients in the latter group follow no rest periods and can be up and about the ward and grounds of their building at will. Thus far, no appreciable difference has been noted in the response of the two groups as measured by sputum conversion and roentgenographic evidence of clearing of the lung lesions, but morale of the ambulant group is much better. Further, this group is permitted to start educational and rehabilitation training shortly after admission.

**Chemotherapy** The length of chemotherapy has been constantly increasing since the introduction of combined drug treatment. All patients with active disease are given drugs for a minimum of 12 months whether the lesion is glandular, renal, pulmonary,



or of bone. One of the following drug combinations is commonly employed: 300 to 450 mg of isoniazid (INH) daily with 12 grams of para-aminosalicylic acid (PAS) daily, INH and 2 grams of streptomycin sulfate (SM) every three days, or PAS and SM.

The simultaneous use of three drugs was found to have no advantage over dual therapy. Ordinarily isoniazid, the most effective of the antituberculosis drugs, was included in the therapy of previously untreated patients. The use of isoniazid alone in early reinfection tuberculosis has been advocated by a few physicians but no patients were placed on such a regimen. When treating primary tuberculosis in infants on the strength of only a positive tuberculin test, isoniazid alone was sometimes employed.

Isoniazid at conventional dosage rarely caused peripheral neuritis. With higher dosage it appeared in about 5 per cent of the patients. Pyridoxine hydrochloride is employed to prevent this complication. PAS is still a difficult drug to administer because of the gastro-intestinal irritation produced in some patients. The freshly prepared solution of sodium PAS is used. More acceptable preparations in stable powder form seem to be in the making. Eighth nerve toxicity from streptomycin with conventional dosage was an infrequent complication. Periodic audiograms are done on all patients, but vestibular studies are no longer routinely performed.

The re-treatment case with resistance to all three drugs is a difficult problem. The continued use of INH in such patients was favored despite the predominance of resistant strains. As a companion drug viomycin sulfate was adequate. Pyrazinamide was used with caution as its hepatotoxicity is still not a settled question. Oxytetracycline is a satisfactory short term substitute for PAS and was employed occasionally.

How effective is drug therapy in converting the sputum? First it is to be noted that the per cent of patients treated to maximum hospital benefit (1955) who had a positive sputum sometime during their treatment was: military 69 per cent, veterans, 52 per cent and civilian dependents 63 per cent. In a special study of 200 military patients treated to maximum hospital benefit (1953-1954) it was found that in the majority a positive sputum is converted in the first two months. After six or more months of treatment only 10 patients still had a positive sputum. It is of further interest that pulmonary operations were performed on 50 per cent of these same patients. *Mycobacterium tuberculosis* was found in the surgical specimen in all except five.

**Temporary Collapse.** Artificial pneumothorax was abandoned at this hospital in 1952 and artificial pneumoperitoneum two years

Inter (fig 1) Whether the infection is in the lung or other tissues, the response to drug therapy seemed much the same. The added benefits ascribed to lung collapse are not very convincing and would appear to be outweighed by the potential complications and inconvenience to the patients.

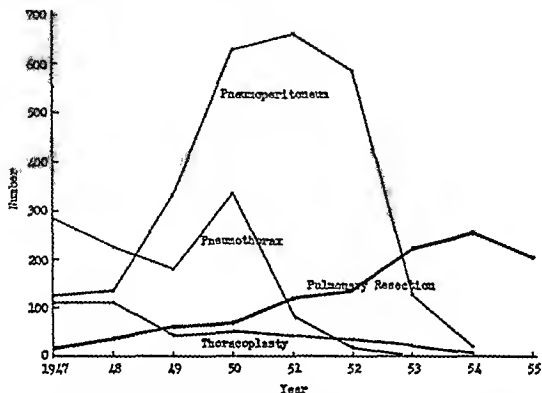


Figure 1 Trend in surgical procedures used in the treatment of patients with pulmonary tuberculosis 1947-1955

**Surgery** Table 3 shows a 100 per cent increase in pulmonary resections between 1952 and 1954. In 1954, 51 per cent of the patients treated to the inactive stage of the disease had resections, largely segmental. The number and type of procedures performed are listed in table 4. Figure 1 indicates that the peak year for pulmonary resections was 1954. The decline since then has resulted largely from a decrease in segmental resections for small caseonodular residuals (under 2 cm in diameter) and for upper lobe segments that are contracted, fibrotic, and often bronchiectatic but without large nodular residuals. This changing attitude is prompted by the minimum activity often seen in the surgical specimens plus an increasing confidence in the adequacy of long term drug therapy with isoniazid. Furthermore, while the mortality is low, the morbidity following resections has been sufficiently high to invite more conservatism. It is to be pointed out, however, that it appears likely that proportionately more resections will continue to be recommended for career soldiers than for civilian patients until follow up studies have been com-

or of bone One of the following drug combinations is commonly employed 300 to 450 mg of isoniazid (INH) daily with 12 grams of para aminosalicylic acid (PAS) daily, INH and 2 grams of streptomycin sulfato (SM) every three days or PAS and SM

The simultaneous use of three drugs was found to have no advantage over dual therapy. Ordinarily isoniazid the most effective of the antituberculosis drugs, was included in the therapy of previously untreated patients. The use of isoniazid alone in early reinfection tuberculosis has been advocated by a few physicians but no patients were placed on such a regimen. When treating primary tuberculosis in infants on the strength of only a positive tuberculin test isoniazid alone was sometimes employed.

Isoniazid at conventional dosage rarely caused peripheral neuritis. With higher dosage it appeared in about 5 per cent of the patients. Pyridoxine hydrochloride is employed to prevent this complication. PAS is still a difficult drug to administer because of the gastro intestinal irritation produced in some patients. The freshly prepared solution of sodium PAS is more acceptable preparations in stable powder form seem to be in the making. Eighth nerve toxicity from streptomycin with conventional dosage was an infrequent complication. P audiograms are done on all patients but vestibular P no longer routinely performed.

The re treatment case with resistance to all the difficult problem. The continued use of INH was favored despite the predominance of resistance. A companion drug viomycin sulfato was added. Viomycin was used with caution as its hepatotoxicity was a question. Ox tetracycline is a satisfactory question. Ox tetracycline is a satisfactory for PAS and was employed occasionally.

How effective is drug therapy in comparison with surgery? It is to be noted that the per cent of hospital benefit (1955) who had a permanent cure in their treatment was military 90 per cent and civilian dependents 70 per cent of 200 military patients treated (1954). It was found that in the first two years of treatment only 10 patients had a permanent cure. Further interest that 10 per cent of these same patients in the surgical series

Temporary Collep  
this hospital in

pleted This is because present figures suggest a lower reactivation rate for the resected patients<sup>7</sup>

### DEATHS

There were 17 deaths in 1955 or 2.2 per cent of the 790 tuberculous patients, as compared with 35 deaths in 1,184 tuberculous patients (3.0 per cent) in 1952. The various causes of death are detailed in table 5. No patient died of progressive tuberculosis. Most deaths resulted from pulmonary fibrosis, emphysema, or hemorrhage secondary to long-standing tuberculosis. For the second year there were no deaths caused by tuberculous meningitis.

TABLE 5 Cause of death in patients with tuberculosis 1952 and 1955

Cause of death	1952		1955	
	Number	Per cent	Number	Per cent
Total	35	100.0	17	100.0
Surgical (total)	5	14.3	3	17.6
Operative			1	5.8
Early postoperative period	2	5.7	2	11.8
Late postoperative period	3	8.6	-	-
Medical (total)	30	85.7	14	82.3
Nontuberculous causes	8	22.8	5	29.4
Tuberculous (total)	22	62.9	9	52.9
Meningitis	4	11.4		
Progressive or pneumonic tuberculosis	10	28.6		
Pulmonary insufficiency	5	14.3	7	41.2
Massive hemorrhage	1	2.9	2	11.7
Silicotuberculosis	2	5.7		

An evaluation of the success in treating veterans and civilian dependents is seen in table 6, which shows an appreciably higher percentage of successful results for both groups in 1955 than in 1952. The 1955 percentage of 87.6 for dependents versus 35.9 for veterans emphasizes the need for a stricter control of the Veterans Administration patient. The military tuberculosis hospital has an advantage in that the patient can be kept until his disease is inactive. However, such hospitals have a special responsibility to do everything possible to assure a low relapse

rate because military life can be conducive to the ready spread of infection

TABLE 6. Results of treatment of veterans and civilian dependents with active tuberculosis 1952 and 1955

Result	Veteran				Civilian dependent			
	1952		1955		1952		1955	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total	306	100.0	117	100.0	125	100.0	210	100.0
Successful (Cured)	81	26.5	4	3.9	77	61.6	184	87.6
Unsuccessful	225	73.5	75	64.1	48	38.4	26	12.4
Good chronic	18	5.8	17	14.5	6	4.8	3	1.4
Deaths	9	9.1	13	11.1	2	1.6	3	1.4
Intergular disease	179	58.6	45	38.4	40	32.0	20	9.6

### SUMMARY AND CONCLUSIONS

The length of hospitalization has been reduced for the military patient with tuberculosis but it is still longer than that in civilian practice

Only 50 per cent of the military patients treated for active tuberculosis are found to have a positive sputum. The majority of positive sputums convert in three months.

Dual drug therapy for a minimum of 12 months is favored. For primary treatment cases isoniazid is employed. As a companion drug para-aminosalicylic acid is probably superior to streptomycin sulfate.

Prolonged bed rest seems destined to play a minor role in the treatment program. The experience with in-hospital ambulant treatment has been very encouraging. With this trend a more aggressive in-hospital rehabilitation program is possible.

In 1954 50 per cent of the military patients treated to maximum hospital benefits had pulmonary resections. Since then this percentage has been declining with fewer segmental resections being performed for minimal residuals. This decline appears to be due to an increasing confidence in drugs, particularly isoniazid.

Temporary collapse measures have been abandoned

Treatment results of military patients are excellent because disciplinary powers result in practically all being treated to the inactive stage of the disease. Their relapse rate on follow up after three years of active duty is 3 per cent.

The program now in operation since 1951 has been successful. The serviceman contracting tuberculosis is no longer separated, pensioned for life, and his special skills lost to the Army. He is now returned to active duty, usually in less than two years, where assignments to fit his physical capabilities are provided.

#### REFERENCES

- 1 Tempel C. W. Pitts F. W. Mayock R. L. Stead W. W. Plum J. B. Bird K. T. Sands J. H. and Roque F. T. Analysis of hospital records of patients discharged from large tuberculosis service use of punch cards in evaluating data from 1 423 cases. *U S Armed Forces M. J.* 4 1719-1733 Dec 1953
- 2 Mayock R. L. Burke R. M. Pinney C. T. Gregory L. J. Wier J. A. New trends in treatment of tuberculosis analysis of 1 358 records from large Army hospital. *U S Armed Forces M. J.* 6 35-50 Jan 1955
- 3 Tempel C. W. and Wier J. A. Trends in management of pulmonary tuberculosis. *U S Armed Forces M. J.* 8 14-30 Jan 1957
- 4 Wier J. A. Morse W. C. Curry F. Storey P. B. Tempel C. W. and Nichols G. Preliminary report of inpatient ambulatory treatment of tuberculosis. *Tr Nat Tuberc A.* 1955
- 5 Storey P. B. and Wier J. A. Antimicrobial therapy of pulmonary tuberculosis current status. *U S Armed Forces M. J.* 7 157-171 Feb 1956
- 6 Wier J. A. Storey P. B. Tempel C. W. Weiser O. L. Streptomycin isoniazid and para-aminosalicylic acid in treatment of pulmonary tuberculosis. *Am. Rev. Tuberc.* 73 117-122 Jan 1956
- 7 Ware P. F. Stauss H. K. Dillon R. J. Tempel C. W. Present status of pulmonary resection in treatment of localized necrotic residuals of pulmonary tuberculosis review. *Am. Rev. Tuberc.* 73 165-190 Feb 1956

# CINEPLASTY

## Results of Follow Up Study

THOMAS J CANTY *Captain, MC USN*  
EUGENE E BLECK *M. D.*

CINEPLASTY has gained in popularity in recent years but there are few follow up studies available for its evaluation. The objective of this study was to determine whether or not the cineplasty was worthwhile to the patient. If it was not effective in providing a functional artificial arm an attempt was made to discern the cause of failure.

Forty patients with known results from cineplasty comprise the basis of this report. These patients had cineplasty operations between 1946 and 1952. Of the 40 patients, 28 had biceps cineplasties and 12 had pectoral cineplasties.

### SELECTION OF PATIENTS

All of the patients were young adult males between 20 and 35 years of age. The level of amputation varied. No biceps cineplasties were done on above elbow amputations and pectoralis cineplasties were not performed on long above elbow amputations. Only the most co operative and more intelligent patients were selected. The operation was explained in detail to these patients and they were informed regarding the advantages of the cineplasty. No attempt was made to force a patient's decision.

### OPERATIVE TECHNIC

The operative technic followed was that described by various authors differing only in several minor details.<sup>1-4</sup> All of the operations were performed under general anesthesia. The skin flap raised for the muscle tunnel measured at least 3 by 3 inches and the base of the flap was made slightly wider than the sides and ends. After the biceps muscle was dissected completely from its bed the insertion was severed. The muscle tunnel was made with Mayo scissors through the thickest and most central portion of the biceps muscle and was made large enough to accommodate the index finger. It is important in biceps cine

plasty that the tunnel be made perfectly straight, with its axis directly perpendicular to the long axis of the arm

### THE PROSTHESIS

Laminated plastic sockets were used in all patients.<sup>5</sup> The muscle tunnel pegs were made of soft dental acrylic molded over a stainless steel core surrounded by a vinyl plastic tube. The pegs were either straight or "C" shaped (figs 1 and 2)

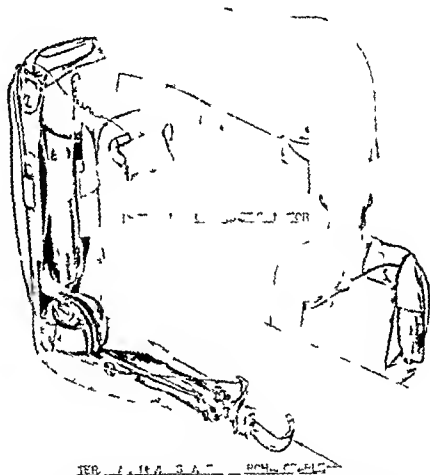


Figure 1 Cineplastic aluminum arm for shoulder disarticulation.

### TRAINING IN THE USE OF THE PROSTHESIS

This final phase of treatment is the most important aspect in ensuring a good result from the operation. It first consists of postoperative exercises of the muscle motor. Those with biceps cineplasties were taught not to supinate the forearm when contracting the biceps muscle. The training in the use of the prosthesis was conducted by the occupational therapist and the amputee instructor. In addition to dexterity with the prosthesis, functional skills such as dressing, handling a screw driver, typing, writing, et cetera, also were taught. Each patient had to pass an Achievement Test (fig 3) before he could be discharged.



11 patients were equipped with the Dorrance hook Army Prosthetics Research Laboratory (APRL) hook and APRL hand The Achievement Test was given with each of these terminal devices

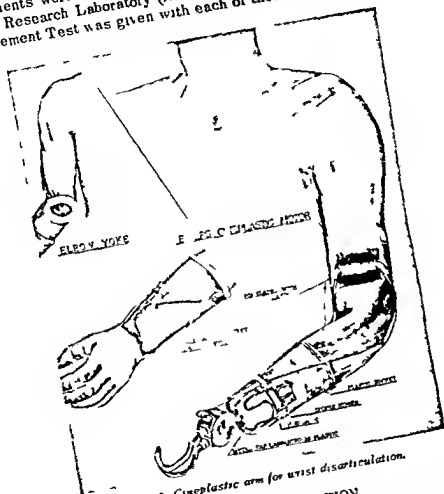


Figure 2. Cineplastic arm for wrist disarticulation.

### METHOD OF EVALUATION

All patients were sent a standard questionnaire devised by the U S Army Prosthetics Research Laboratory Washington D C for the purpose of analyzing the results of cineplasty. A questionnaire study was deemed valid in reaching conclusions. This gave the patients' reactions to the procedure. In addition an objective study complete with examinations was made of patients who resided in the San Francisco Bay Area.

### RESULTS

Of the 40 patients questioned 33 (82.5 per cent) were using their prostheses. Twenty three (82.1 per cent) of these had biceps cineplasties and 10 (83.3 per cent) had pectoral cineplasties. Table 1 shows the effects of surgical complications on patients' decisions to use prostheses. Only 3 patients were

Name				R				T				D			
Amputation				T				T				T			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D				D				D				D			
D															

Figure 3 The Achievement Test which each patient had to pass before he could be discharged.

unable to use their prostheses because of surgical complications. Patients who were using their cineplastic prostheses gave a variety of reasons for their preference for this type over the conventional type which they had worn previously and which could be used at any time (table 2) Of the 23 patients using their biceps cineplastic prostheses, 22 preferred this type to

a conventional one, of the 10 who were using pectoral cine plastic prostheses 9 preferred them to the conventional type. Only one patient did not consider as worthwhile the extra time of hospitalization required for training in use of a cineplastic prosthesis.

TABLE 1 Effects of surgical complications on patients' decisions to use prostheses

Surgical complications	Prostheses		Total (40) (per cent)
	Biceps (28) (per cent)	Pectoral (12) (per cent)	
Skin breakdown	21.4	16.6	20
Prohibited use	3.6	8.3	5
Incidental	17.8	8.3	15
Contracture of tunnel openings	7.0		5
Prohibited use	3.5		2.5
Incidental	3.5		2.5
Inadequate excursion			

It should be noted that 6 patients had skin breakdown of the ineplastic tunnel, but this was not sufficient to eliminate permanently the use of the prosthesis. One patient had a contracture of the tunnel opening but was still able to use his cineplastic prosthesis.

TABLE 2 Patients' opinions as to advantages of cineplasty

Reason	Biceps	Pectoral
Arms should shrug	23	9
Arms shoulder harness	23	9
Better grip and control	22	8
Lighter and easier to use	21	7
More work in wider range	19	9
Sense of touch of normal arm	3	
Independence of arms	2	2
Permits use of velocity elbow lock		Not used

Five patients with biceps and two with pectoral cineplasties were not using their cineplastic prostheses. Table 3 summarizes the reasons these patients gave for not using their prostheses. Poor co-operation of three patients is given as a reason for failure to use their prostheses. This again points out the importance of proper selection of patients for the operation. Five

TABLE 3 *Reasons patients gave for not using cineplastic prostheses*

Reason	Biceps	Pectoral
Extra time in hospital not considered worthwhile	4	1
Like shoulder control better	3	1
Poor co-operation	1	2
Painful stump or just uncomfortable	2	
Intermittent skin breakdown	1	1
Contracture of tunnel openings	1	-
Breakdown of tunnel	1	-
Prosthesis lost or broken	1	-
Inadequate excursion		-
Does not require a prosthesis	-	-
Unsatisfactory in cold weather	-	-
Attributable to hospital management		

of the seven patients who were not using their cineplastic prostheses were wearing conventional ones, and two were not wearing any prosthesis. Table 4 shows the level of amputation in these patients.

TABLE 4 *Use of conventional rather than cineplastic prosthesis in relation to the level of amputation*

Level of amputation	Using	Not using
Below elbow	4	1
Shoulder disarticulation	1	1

Use of the cineplastic prosthesis by patients in relation to the level of amputation is shown in table 5. The figures are in conclusive, deliberate selection of patients with long below elbow stumps for biceps cineplasties produced the high per cent of good results in this group. Cineplasty is not recommended in forearm flexors and extensors because the tunnels have limited excursion and power. The use of biceps cineplasty in long above elbow stumps is not desirable because shoulder harnessing is necessary in order to hold the socket on to the stump. Pectoral cineplasties were not particularly advised on long or medium above elbow stumps inasmuch as it does not offer any great functional improvement and does not eliminate harnessing. Pectoral cineplasty for the very short above elbow

stump or shoulder disarticulation is definitely indicated, since it does make a much more functional prosthesis

TABLE 5 Use of cineplastic prosthesis in relation to the level of amputation

Level of amputation	Prosthesis			
	Biceps		Pectoral	
	Using	Not using	Using	Not using
Very short	2	1	9	2
Medium	10	3	1	
Long	11	1		

### CONCLUSIONS

The good results (82.5 per cent) in patients who had cineplasties were higher than we anticipated and better than those reported by others.<sup>1</sup> In an attempt to analyze the reasons for the high per cent of good results the following factors appear to be most important

1 *The selection of patients* This cannot be emphasized too strongly, intelligent and co-operative patients who desire the operation are a great asset

2 *A modern and comfortable prosthesis* In former years the prostheses were not successfully adapted to a cineplasty and even though cineplasties were adequate surgically failures resulted from poorly constructed and poorly functioning prostheses

3 *Training in the use of the prosthesis* This is the final important phase of treatment and cannot be neglected. An occupational therapist with a fully co-ordinated program is essential

### REFERENCES

- 1 Alldredge R H Cineplastic method in upper extremity amputations *J Bone & Joint Surg* 30-A 359-373 Apr 1948
- 2 Kessler H H Cineplastic amputation *Surg Gynec & Obst* 68 554-563 Feb (No 2A) 1939
- 3 Kessler H H Cineplasty Chiles C Thomas Publisher Springfield Ill 1947
- 4 Spittler A W and Rose I F Cineplastic method for prostheses of arm amputees *J Bone & Joint Surg* 33 A 601-611 632 July 1951
- 5 Carty T J New cineplastic prostheses *J Bone & Joint Surg* 33 A 612-617 July 1951
- 6 Brav E A Spittler A W LaComb H B Yarrert J H McDonald W F Vulte F E Jr Woodward G H Fleischman M J and Leonard F Cineplasty and result study *J Bone & Joint Surg* 39-A 39-75 Jan 1957

# SIMPLIFIED METHOD OF PULP CAPPING ADULT TEETH WITH CALCIUM HYDROXIDE

EVERETT D MUMAW *Captain USAF (DC)*

PHILLIP COOPER *D D S*

**T**HE TECHNICS of pulp capping, pulpotomy, and pulp curettage have developed with little benefit of basic research or scientific study. A survey of the literature indicates that there is no preferred technic of pulp capping which is generally accepted and practiced by the dental profession.

The first report of pulp capping appeared in 1756, at which time Pfaff<sup>1</sup> recommended that gold foil be placed over the exposure. In 1826 Koocher<sup>2</sup> proposed that lead lens be used after curettery with a red hot wire. Even as late as 1950, one typical textbook<sup>3</sup> recommended Pfaff's technic, but added the use of the rubber dam along with sterilization and antibiotics.

Scientific studies have justified many of the procedures used in dental practice and frequently have resulted in their improvement, however, this is not the case in regard to pulp capping. If a vital pulp is exposed in an adult patient by caries or mechanically, a common procedure is either to undertake root canal therapy or to extract the tooth. This practice is encouraged by textbooks that discourage pulp capping except in select cases, and that insist upon time consuming and almost impossible conditions of aseptic technic, temporary restorations, and use of multiple materials.

Many materials are described as acceptable, and the recommended technics of application vary widely. Among the most frequently recommended pulp capping materials are zinc oxide and eugenol,<sup>4</sup> calcium hydroxide,<sup>5-13</sup> and thymol cement.<sup>14, 15</sup> These are either used alone or are applied in combination with other materials.

The first attempts to discover a scientific basis for the use of any specific technic or material were several independent

---

Presented at the meeting of the Philippine National Dental Association Manila P I  
4 May 1956

From 6000 U S Air Force Dispensary APO 925 San Francisco Calif Captain  
Mumaw is now at 7030th U S Air Force Dispensary APO 12 New York N Y

studies for evaluating calcium hydroxide as a pulp capping agent. The number of cases involved in these studies varied from 6 to 45. The studies covered periods extending to 16 weeks, and presented both histologic and clinical evidence supporting the use of calcium hydroxide.

### MATERIAL AND METHOD

The present study was undertaken to obtain clinical evidence as to whether pulp capping with calcium hydroxide is a simple and effective method of treatment that can be accomplished without time consuming and complicated procedures. Whereas previous work has been largely limited to deciduous teeth, this study reports on adult teeth with no age limitation. Cases were selected at random from patients at Keesler Air Force Base, Mississippi, and Tachikawa East Air Force Base, Japan. The age of the patients varied from 17 to 46 years, averaging 27 years.

Teeth with pulp exposed by caries or by mechanical means were used and since the ultimate desired result was the same, namely preserving the vitality of as much remaining pulp as possible, pulp capping was not differentiated from pulp curettage or pulpotomy in cases where either operation was performed prior to the actual pulp capping procedure. Pulp curettage and pulpotomy were treated merely as steps to be used, if necessary, in order to remove all caries prior to proceeding with the pulp cap.

Tooth location was not considered of importance in deciding on pulp capping. Reasonable accessibility was the only criterion with posterior teeth being most frequently pulp capped. One or more of the five surfaces of the coronal portion of the tooth was involved in each of the completed restorations. The number of pulp capped teeth per patient ranged from one to three.

A few of the pulp capped teeth were used as fixed bridge and partial denture abutments. In these instances permanent restorations were made then at varying later dates the teeth were reprepared for prosthodontic abutment use.

A standard operating procedure was developed with the exception that each of the eight operators chose his own moistening agent for calcium hydroxide and used it consistently. Sterile technique was not employed either in the oral cavity or in the exposed tooth cavity nor were rubber dams, antibiotics or temporary fillings used.

Preliminary roentgenograms were taken of each tooth either before any operative work was undertaken or before the exposure was capped and only teeth that had no apical involvement and had reached full adult apical development were used in this study. In every case all caries was removed using normal clean

dental operating procedures. When the carious portion extended to the pulp, it was completely removed no matter how far into the pulp the operator had to go. If a pulp upon exposure showed any visible signs of infection, enough of it was removed to leave healthy bleeding pulp. Bleeding induced by the removal of caries was allowed to subside without interference.

The tooth cavity and mouth were then rinsed with tap water, and the cavity was air dried as completely as possible. A thick layer of calcium hydroxide powder or paste was applied directly over the exposure. The calcium hydroxide cap was lightly air dried so as not to disturb it, and completely sealed over with zinc phosphate base cement. Next, the cavity preparation was completed and a permanent restoration placed (fig. 1). Silver amalgam was the most frequently used permanent restorative

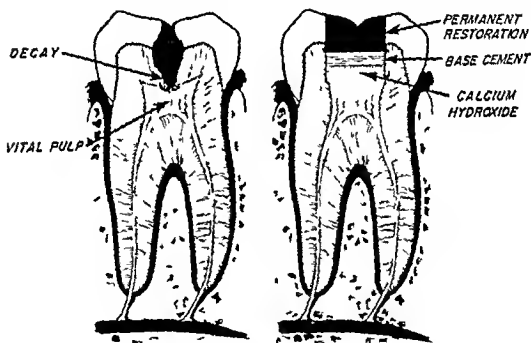


Figure 1 Pulp capping of adult tooth with calcium hydroxide

material, however, a few of the teeth in this study were restored with gold crowns, silicate cement, or acrylic filling materials. The entire procedure, including a final roentgenogram, was completed in a single appointment and the patient dismissed, to report back at specified intervals.

The size of each pulp exposure was identified by its estimated diameter, or length and breadth, in millimeters. These sizes ranged from 0.5 mm to 4.0 mm, with an average of 2.0 mm. In every case there was a clinically vital  $\sqrt{1}$  stump maiming to be capped.



The moistening agent used in mixing the calcium hydroxide pasto was tap water, sterile water anesthesia solution or zephirin chlorido. The pasto was mixed on a clean glass slab or paper pad and applied with a brush, cement instrument, amalgam carrier, or other suitable instrument.

Because of the roentgenographic characteristics of the restorative materials used, the obscuring locations, and the size of the restorations placed, most of the roentgenograms were of little use except as a check on apical conditions and periodontal membrane thickening. One operator used calcium hydroxide mixed with 25 per cent zinc oxide in an attempt to make the calcium hydroxide radiopaque. More than 25 teeth were pulp capped with this mixture, but it was found that the radiopacity of the calcium hydroxide was only slightly improved. The zinc oxide calcium hydroxide mixture gave the same clinical results as to tooth vitality as did calcium hydroxide alone.

Of the 304 teeth that were pulp capped in the course of this study, the records of 140 were not available for final analysis because of personnel movements and the exigencies of military service. Five of the remaining 164 were extracted within 2 weeks leaving 159 capped teeth that were carefully observed for a year or longer.

Each tooth was examined clinically at the end of 2, 6, and 12 weeks after being capped, if possible by the original operator. Records were consolidated by the authors and the teeth rechecked at 12 months (in 8 cases, also at 18 months). The examinations included roentgenograms, percussion, use of ice cones and vitality tests with the S S White Vitalometer or its equal. Teeth were considered to be vital if they compared in vitality with adjacent untreated teeth.

## RESULTS

The critical period for a pulp capped tooth appeared to be the first 2 weeks. Seventeen of 164 teeth caused intermittent pain, and 5 of those were extracted within the first 2 weeks. Of the other 126 had gradually become painless by the end of 6 weeks and all pain had disappeared in the remaining 6 by the end of 10 weeks. Fifteen other teeth were sensitive initially to extremes of temperature. Only one of these was still sensitive at the end of 6 weeks and it too had lost its sensitivity by the end of 12 weeks.

If pain or temperature sensitivity did not develop within 3 days it did not develop during the entire period of observation. No drugs were used to reduce either pain or sensitivity. Obviously sensitivity to extremes of temperature was not prognostic of

failure of a pulp capping operation, nor was pain necessarily so, considering that of 17 teeth which caused pain, 12 became painless within 6 to 12 weeks and were still vital at the end of a year.

The type of moistening agent used in preparing the calcium hydroxide paste did not appear to have any bearing on the clinical outcome. The number of teeth that were symptomatic after pulp capping, including the 5 that were extracted in the first 2 weeks, were evenly distributed among the various operators.

Of 164 pulp capped teeth, 5 (3.0 per cent) were extracted, but 159 (97.0 per cent) were vital and in good condition at the end of a year. The growth of secondary dentin was readily discernible in roentgenograms taken after approximately a year and a half (fig. 2). Throughout the age range of 17 to 47 years the results obtained were essentially equal.



Figure 2 Roentgenograms of lower left second bicuspid taken immediately after placing permanent restoration (left) and after 17 months (right) showing growth of secondary dentine.

Of special interest is the fact that 3 patients whose teeth have flown at altitudes of 25,000 feet are not experiencing symptoms of any kind in the area of the teeth.

### SUMMARY

In the absence of a generally accepted method and because of the complicated nature of the technique advocated, exposure of a vital pulp chamber or root canal therapy or extraction of a tooth may be saved.

A simple method of pulp capping using calcium hydroxide without use of sterile technique, rubber dam, or zinc phosphate fillings was found to be clinically effective.

Of 164 teeth that were pulp capped, 5 (3.0 per cent) became painful and were extracted, 159 (97.0 per cent) were vital and in good condition at the end of a year.

while 159 (97.0 per cent) were vital and in excellent condition after a year or more.

Twelve of the 159 teeth that were saved by pulp capping caused some pain at first, and 15 others were initially sensitive to extremes of temperature, but in all cases both pain and sensitivity had completely disappeared by the end of 12 weeks.

**ACKNOWLEDGMENT** We wish to thank the following for their assistance in the preparation of this article: Dr Meyer Schwartz, Dr Richard Mahler, Dr William Pirsch, Dr M. William Rose, Captain Richard Yokoyama, USAF (DC) and Captain William Gast, USAF (DC).

### REFERENCES

- 1 Pfaff, P. *Abhandlung von den Zaeenen des menschlichen Koerpers und deren Krankheiten*. Berlin 1795
- 2 Koeck, L. *Principles of Dental Surgery*. Masters Thomas and George Underwood 32 Fleet St. London England 1826 p 437
- 3 Miller, S. C. and Newman, A. T. *Oral Diagnosis and Treatment*. 2d edition. Blakiston Co. Philadelphia Pa 1950 p 404
- 4 Tanaka, N. I. Pulp-capping with zinc-oxide-eugenol and calcium hydroxide: clinical studies on 135 patients. *J Dent Chld*. 3d Quarter 16-20 1951
- 5 Arzoo, U. Pulp-capping with zinc-oxide-eugenol. *J Am Dent A*. 49 391-401 Oct 1954
- 6 Brink, H. Maintaining vitality of injured permanent anterior teeth. *J Am Dent A*. 30 179-187 Feb 1943
- 7 Easlick, A. A. Management of pulp exposures in mixed dentition. *J Am Dent A*. 47 506-515 Nov 1953
- 8 Eich, W. D. Pulp management in mixed dentition. *J Am Dent A*. 50 241 Feb 1955
- 9 Maier, M. Explains failure of pulpotomy. *Rader Comments Sect A*. *J Am Dent A*. 50 241 Feb 1955
- 10 Shoemaker, C. P. Results of 28 pulpotomies. *J Am Dent A*. 50 71 Jan 1955
- 11 Slack, G. L. Vital pulpotomy in treatment of fractured incisors. *Brit Dent J*. 94 32-37 Jan 20 1953
- 12 Smith, W. D. Essentially practical approach to pulp capping and pulpotomy. *Dent J Australia* 25 233-238 Dec 1952
- 13 Whitely, N. L. Pulp capping and immediate permanent filling. *Bull Oklahoma Dent A*. 37 26-31 Apr 1949
- 14 Jenson, P. Pulp insulation and capping. *New York State Dent J*. 44 447 Oct 1948
- 15 Patterson, S. S. and Van Huysen, G. Treatment of pulp exposures. *Oral Surg*. 194 206 Feb 1954
- 16 Glass, R. L. and Zander, H. A. Pulp healing. *J Dent Research*. 28 97-107 Apr 1949
- 17 Hermann, B. W. Dentinoblation der Wurzelkanal. *Nachbehandlung Mit Calciumhydroxid*. *Zahnarzt Rundschau* 21 887 1930
- 18 Hermann, B. W. Zum Kapitel Biologisch Wurzelfüllung. *Deutsche Zahnärztliche Wochenschr*. 37 526 1936
- 19 Sawyer, H. F. and Amar, I. W. J. Use of calcium hydroxide as a pulp-capping material: clinical study in young adults. *U S Armed Forces M J*. 8 1155 1164 Aug 1954
- 20 Tischer, G. W. and Zander, H. A. Preliminary report on pulp exposures. *Oral Surg Univ Med Sch Bull*. 39 4 1938
- 21 Zander, H. A. and Glass, R. L. Healing of phenolized pulp exposures. *Oral Med. & Oral Path*. 2 803-810 June 1949
- 22 Zander, H. A. Reaction of pulp to calcium hydroxide. *J Dent Research*. 18 373 Aug 1939
- 23 Vignoli, W. F. Evaluation of deciduous molars treated by pulpotomy and calcium hydroxide. *J Am Dent A*. 50 34-41 Jan 1955

# SUBUNGUAL EXOSTOSIS

RICHARD S GILBERT *Lieutenant (junior grade) MSC USA*  
HERBERT H STARR *Lieutenant MC USNR*

THE PAIN and discomfort of foot disorders can have a deleterious effect on the mental attitude and physical condition of the man in service. At recruit training centers, the podiatrist sees great numbers of various foot disorders and can treat many of the more time consuming and nonsurgical conditions, thus lightening the workload of the orthopedic surgeon. Close harmony can and should exist between podiatrist and surgeon.

Subungual exostosis is only one of the many, frequently seen disorders of the toes. Exostosis occurs elsewhere in the foot, but the subungual location is important, for it is easily overlooked and causes great discomfort. Lowin<sup>1</sup> described this condition as irritative, warty overgrowth of bone occurring beneath the nails in the form of solitary, benign, slowly growing, fibrous nodules the size of peas, which almost invariably are located on the inner or tibial margin of the terminal phalanx of a great toe. They arise as a cartilaginous outgrowth and become osseous. Their attachment to the phalanx is usually complete or osseous, but may be partial or fibrocartilaginous.

Pardo Castello<sup>2</sup> stated that these lesions are not true tumors but outgrowths of normal bone tissue or calcified cartilaginous remains, varying in size from a few millimeters to two or more centimeters. Coming from the subjacent bone, they raise the whole nail or break through one of the sides or even through the plate itself, and the nail becomes distorted or is shed. Gross and associates<sup>3</sup> suggested that the condition is an inflammatory hyperplasia of bone, cancellous in character and growing upward after the osteogenic cells of the periosteum have been irritated.

The exact cause of the lesions is unknown. Most authorities agree that trauma plays an important part, if not the major factor, it certainly precipitates their growth. The possibility that subungual exostosis may represent a tetralogic anomaly has been suggested.<sup>4</sup> One theory<sup>4</sup> assumes that the growth is an attempt on the part of the terminal phalanx to form a double digit. Vinson<sup>5</sup>

From U S Naval Training Center and U S Naval Hospital San Diego Calif

stated that it is not improbable that some of these have been, in reality, supernumerary digits. Chronic infection about the nail bed is another possibility. Repeated minimal trauma over a period of years is sufficient to initiate this lesion. The great toe is the usual site, and this would appear to lend added significance to the trauma theory. It is generally agreed that the great toe is subjected to more trauma than are any of the lesser toes. Subungual exostosis is extremely rare on the hand, and most of the cases reported have involved the index finger.<sup>5</sup>

Granuloma pyogenicum, onychomycosis, ingrowing nail, fibroma subungual verruca cutaneous horn, melanoma, glomus tumor, and subungual heloma (corn) should be considered in the differential diagnosis. Roentgenographic examination is necessary to establish the diagnosis.

Very often this lesion may be present for years and remain undetected. Pain may be present, but frequently a lesion remains painless unless traumatized. The slight trauma produced by trimming the nail may be responsible for initiating symptoms. There is a tendency for the growth to increase in size, which in many cases influences the patient to seek medical advice.

The growth usually appears in patients who are from 12 to 30 years of age. A difference in incidence between the sexes is not established. The majority of those who do report a higher incidence in the female suggest that there is a relationship between the development of this lesion and the wearing of high heels.<sup>6</sup>

The treatment of choice, complete operative removal, can be accomplished by several methods depending on the location of the lesion. Special attention should be given to the nail bed and matrix during operation to prevent further nail bed deformity and to preserve the integrity of the nail matrix. With careful surgical technique the results are uniformly satisfactory.

### CASE REPORTS

**Case 1.** A 19-year-old recruit complained of pain at the mediobasal end of the right great toe. The toe became progressively more painful during recruit training and after 4 weeks of training he reported to the podiatry clinic for treatment. There was no definite history of previous trauma although the patient thought that he might have injured the toe about three years prior to his recruit training. He stated that a nodule had been present at the end of the nail for at least two years and that it had grown considerably during this period. Six months after first noticing some deformity of the toe plate he visited his family physician and was told he had a fungus infection of the nail. A proprietary drug was prescribed for daily use. No benefit was apparent after using the fungicide for three months.

Physical examination revealed a marked deformity of the nail bed and plate of the right great toe (fig 1). The nail plate was elevated and deformed. The nail-bed deformity gave the appearance of a firm, fibrous keratotic nodule breaking through and raising the nail plate at its most distal and medial part. The nail plate showed evidence of mycotic involvement.



Figure 1 (case 1) Close up of right toe illustrating the nail bed deformity



Figure 2 (case 1) (A) "Table top" exostosis as seen in roentgenogram projecting from the superior surface of the distal phalanx (B) the distal phalanx is normal in appearance

Roentgenograms revealed a large exostosis of the "table top" variety projecting upward and proximally and coming off the superior surface of the distal phalanx of the tight great toe. The exostosis was consistent with the nail bed deformity (fig 2A).

Treatment consisted of palliative measures until the completion of recruit training at which time he was admitted to the orthopedic service of this hospital for surgical removal of the growth. Figure 2B illustrates the postoperative roentgenogram.

Case 2. A 19-year old recruit complained of pain at the mediobasal aspect of the left great toe which started after one week of recruit training. The patient stated that the toenail has looked funny for the last two years. Because the toe was not painful he paid little attention to it. About eight months prior to entering the service a two-by-four piece of lumber fell on his left great toe. The toe was swollen and discolored but he did not receive medical attention. One week after the injury he lost the nail plate.

Deformity of both the nail plate and bed was seen on examination. The mediobasal portion of the nail was elevated and the lesion appeared as a firm pink nodule (fig 3A). Roentgenograms revealed a large subungual exostosis of the "table-top" variety (fig 3B).

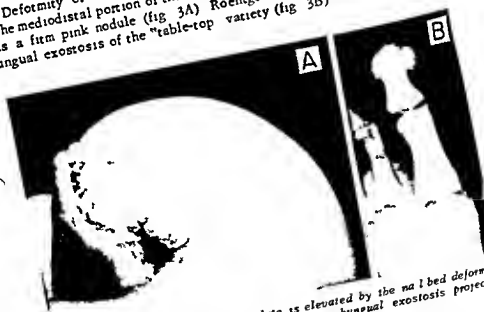


Figure 3 (case 2) (A) The nail plate is elevated by the nail bed deformity (B) Roentgenogram demonstrates a large subungual exostosis projecting from the superior surface of the distal phalanx

Unfortunately roentgenograms were not taken at the time of initial injury. If so a more definite conclusion could be drawn as to the part trauma played in this case. Inasmuch as the patient had noticed a deformity of the nail plate before the injury the exostosis was probably already present. Whether the trauma aggravated the lesion or precipitated it is not known.

tated an increase in growth is a matter of conjecture. The exostosis was removed and the patient had no further difficulty with the toe.

**Case 3** A 40 year old nurse complained of a chronically painful left great toe. For two years she had noticed a small, pink, pealike growth just under the nail plate at the lateral distal aspect of the left great toe. There was no history of trauma, however, for three or four years she had had an ingrowing toenail. As a result of this, she developed a chronic nail infection. The pain was minimal and by wearing wide-toed shoes she remained fairly comfortable. She had never sought medical advice concerning this lesion but came to the podiatry clinic because of worry over an increase in its size.

Physical examination revealed a small, pink, pealike lesion protruding from under the lateral distal aspect of the left great toenail. The nail plate was slightly elevated in this area, otherwise it appeared normal (fig. 4). There was a considerable amount of subungual debris present. Roentgenograms revealed a small "table top" exostosis lying over and attached to the superior portion of the distal phalanx (fig. 5).



Figure 4 (case 3) The lesion protruding from under the lateral distal aspect of the left great nail plate.

Treatment consisted of surgical removal of the lesion. The specimen after operation, because of its size and shape, was considered to be a roentgenogram.



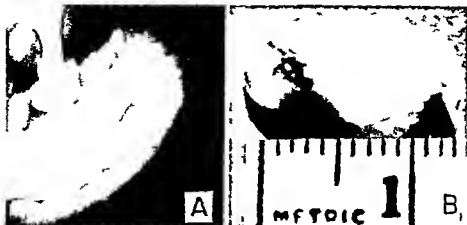


Figure 5 (case 3) (A) Roentgenogram shows exostosis projecting from distal phalanx of left great toe (B) Lesion removed at operation illustrating the discrepancy between actual size of lesion and size of visible portion seen on the roentgenogram.

### SUMMARY AND CONCLUSIONS

Subungual exostosis usually occurs on the great toe. Although the cause has not been fully established, trauma definitely plays an important part. Pain may be severe, mild, or absent. Growth of this lesion may be progressive and often causes the patient to seek medical attention. Such bone growth may exist in any case of nail bed and nail plate deformity and emphasizes the importance of roentgenographic examination. A lateral view plain film demonstrates the growth.

In differential diagnosis, subungual exostosis is confused most frequently with onychomycosis, which often is associated with the exostosis as described in one of the case reports.

Complete operative removal of the exostosis, with care not to injure the nail bed or matrix, is the treatment of choice and consistently produces satisfactory results.

### REFERENCES

1. Lewis, P. *The Foot and Ankle*. 3d edition. L. A. & F. Biggs. Philadelphia, Pa. 1947. pp. 270-271, 27-271.
2. Pedro Castello. *Diseases of the Nails*. 2d edition. Charles C. Thomas Publisher. Springfield, Ill. 1947. pp. 50-53.
3. Groves, R. H. *Modern Foot Therapy*. Foot Therapy Publishing Co. New York, N. Y. 1948. pp. 256-259.
4. Lakshminarayana, N. C. *The Foot*. 4th edition. Butterworths & Co. London. 1951. pp. 301-303.
5. Mason, M. L. *Trends in the Surgery of Gynecology & Obstetrics*. 64: 129-148. Feb. 1937.
6. Lewis, M. R. *Roentgen Foot Diagnosis*. Von Schilling, Morris & Pines. Chicago, Ill. 1952. pp. 212-213.

# SIMPLIFIED MICRORADIOGRAPHY OF BONE AND TEETH

JOHN T. ISTOCK, *Chief Hospital Corpsman USN*  
CLARENCE W. MILLER  
FRED L. LOSKE, *Captain DC USA*

**A** TECHNIC has been developed for the microradiographic study of mineralized tissues using relatively inexpensive radiographic equipment. This technic makes the procedure available to the laboratory, hospital, or teaching institution with a limited research budget. The advantages of investigating biological structures with roentgenologic microscopy were reviewed by Engström, Bellman, and Engfeldt.<sup>1</sup>

Our method is a simplified version of the techniques described by Lamarque,<sup>2</sup> Engström,<sup>3</sup> Arprino and Engström,<sup>4</sup> Engfeldt and Zetterstrom,<sup>5</sup> and Vincent,<sup>6</sup> and as such may serve to entice more investigators into this field of study. The techniques described by the above investigators require the use of relatively expensive beryllium window roentgen ray tubes, and generally, vacuum type systems, whereas our technic employs the cheaper nickel window tube, and omits use of a vacuum system.

The unit we use is a grenz ray (soft roentgen ray) generator manufactured by the Ullman Corporation (fig. 1). This is a small, compact unit, adaptable for use in limited spaces. It consists of a self rectified generator with current range of 0.5 ma and voltage range of 0.30 kvp, plus a tube with tungsten target. Inherent filtration is 0.0008 inch of nickel. The unit is designed for continuous operation, and the heat produced by long exposures has little effect on the microradiograph. It has been noted that if a brief cooling period is allowed between exposures, the current output is more stable. Extra stabilizers can be employed to regulate the incoming current if a continuous fluctuation is noted. This usually is caused by intermittent loads on the power line.

Fresh or fixed bones or teeth are cleansed of soft tissue and cut into sections 50 to 100 microns in thickness (fig. 2) on the Scott and Crisp Tooth Sectioner.\* Sections selected for micro-

From Naval Medical Research Institute National Naval Medical Center Bethesda Md.  
David Scott and Laurence Crisp National Institute of Dental Research Bethesda Md.

radiography are hand lapped to a final thickness of approximately 30 microns. When the desired thickness has been obtained the specimens are washed in absolute ethyl alcohol and dried for one hour. Satisfactory results are obtained with sections varying between 30 and 100 microns. Sections thinner than 30 microns have been used, but unless a specially designed supporting holder is employed, distortion and poor detail result. Distortion always occurs when the specimen is not in uniform contact with the emulsion of the film.

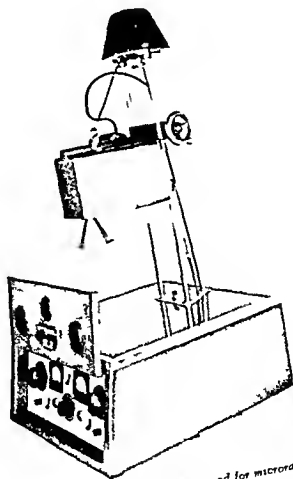


Figure 1 Soft roentgen ray apparatus used for microradiography

With the availability of many fine grain, high resolution spectroscopic plates such as Eastman Kodak 548 and 649 (500 to 1 000 lines per mm), fine detail can be obtained. The GH<sup>100</sup> type emulsion is used instead of the lower sensitivity O type emulsion.

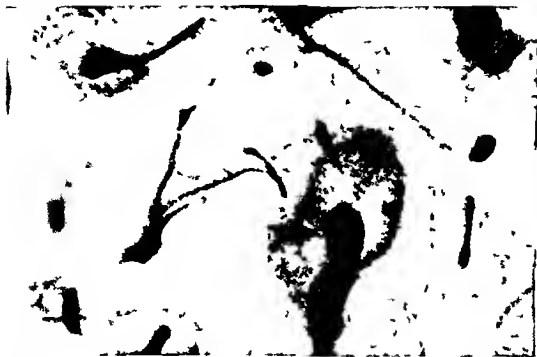


Figure 4 Microradiograph of cross section of human femoral cortical bone from a normal 37 year old male. The varying mineral distribution is readily seen when osteons are compared. The interstitial bone in general appears as more mineralized; the lacunae of the osteocytes appear as black spots. A large Volkmann's canal is entering from the endosteal side into a poorly mineralized osteon. Other Volkmann's canals are visible ( $\times 150$ ).



Figure 5 Microradiograph of six week old anorganic bone implant. Donor bone (A) shows the quantitative distribution of mineral salts in the various osteons. Cortical defect (B) is filled with mineralized callus and anorganic bone chips (C) ( $\times 32$ ).

0.125 inches of lead, then placed in the roentgen ray beam 4 cm from the target. This short distance was selected in order to decrease exposure time. The low milliamperage output of the small roentgen ray generator used prohibits longer target-film distance. A longer target-film distance would be preferable, but with proper centering of the specimen, good results are obtained with the shorter distance.

The average exposure technique for samples of mineralized bone ground to 30 microns, is 12 kvp and 4.5 ma for 35 minutes. For specimens thicker than 30 microns, an increase in kilovoltage and exposure time is required. The exposure time may be increased to as much as 60 minutes for bone sections of 75 microns in thickness. An exposure of 50 minutes at 20 kvp and 2.5 ma produces satisfactory results with tooth sections of 100 microns in thickness.

Spectroscopic plates are processed in Eastman Kodak D 19 developer for 7 minutes at 68° F, with slight agitation each minute during development. The plate is then rinsed in alcohol for 30 seconds with continuous agitation, washed in running water and placed in a standard acid fixer for 30 minutes. After washing for 30 minutes in running water, processing is completed by drying the film in a dust-free atmosphere. If a brown stain appears on the plate, most of it can be removed after the plate has been processed and washed by bathing the plate for 3 to 5 minutes in 95 per cent ethyl alcohol.

The finished radiograph is covered with a standard coverglass and examined under a microscope. Standard photomicrographic techniques are used for recording fields of interest. Photomicrographs ranging from 50 to 250 diameter magnification can be obtained.

Figure 4 shows the uneven distribution of the mineral salts in normal human femoral bone. The Haversian systems (osteons) differ among themselves as well as from the surrounding tissue in degree of mineralization. The organic nature of the osteocyte and its capsule are relatively transparent to roentgen rays and thus appear as round or oval dark spots.

In their study of heterologous bone grafting, Hurley and Losee<sup>10</sup> took microradiographs of bone sectioned through the implant site at various periods after operation. Figures 5 and 6 show the mineral bonding between anorganic donor bone chips and host bone in a six weeks postoperative specimen and leave no doubt as to the biological acceptance of the graft material.

Figure 7, a longitudinal section of human cortical femoral bone, illustrates the complexity of the systems of Haversian and Volkmann's canals, which must be considered in evaluating



Figure 4 Microradiograph of cross section of human femoral cortical bone from a normal 37 year-old male. The varying mineral distribution is readily seen when osteons are compared. The interstitial bone in general appears as more mineralized; the lacunae of the osteocytes appear as black spots. A large Volkmann's canal is entering from the endosteal side into a poorly mineralized osteon. Other Volkmann's canals are visible ( $\times 150$ )



Figure 5 Microradiograph of six week old anorganic bone implant. Donor bone (A) shows the quantitative distribution of mineral salts in the various osteons. Cortical defect (B) is filled with mineralized callus and anorganic bone chips (C) ( $\times 32$ )



Figure 6 Higher power microradiograph of implanted anorganic bone chips. Mineral bonding is apparent between donor chip (A) and host callus (B). Multiple black dotted areas are lacunae which permit easy passage of roentgen rays ( $\times 200$ )



Figure 7 Microradiograph of a longitudinal section from same human cortical bone used in figure 4. Complexity of the canalicular system of cortical bone is apparent. Volkmann's canals are quite numerous and do not appear to have a uniform pattern ( $\times 100$ )

microradiographs. On the enamel side of the dentino-enamel junction near the tip of the dentinal cusp, the spindles become visible because of their organic composition. A region of lower mineral content is represented by the increased radiolucency. In figure 8 the hypocalcified tufts or whorls are seen as wavy black bands in the inner enamel running at right angles to the dentino enamel junction.

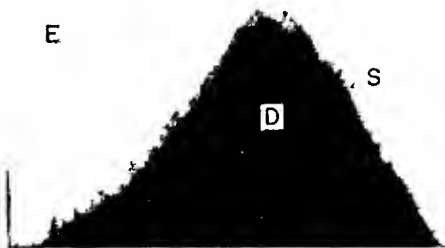


Figure 8 Enamel spindles (S) and dense organic matrix area are visible at the tip of the dentinal cusp (D) in the enamel (E)

#### REFERENCES

- 1 Engström A, Bellman S and Engfeldt B. Microradiography. I. Microradiography. A review. *Br J Radiol* 28: 517-532, 1955.
- 2 Lamarque P. Histologie. Historadiographie. *Compt Rend Acad d sc* 202: 684-687, Feb 1936.
- 3 Engström A. Quantitative micro- and histochemical elementary analysis by roentgen absorption spectrography. *Acta radiol Suppl* 63: 1-106, 1946.
- 4 Engström A. Use of soft x rays in assay of biological material. *Progress of biophysics and biochemistry* 1: 164-196, 1950.
- 5 Engström A. X-ray methods in histochemistry. *Physiol Rev* 33: 190-201, Apr 1953.
- 6 Amprino R and Engström A. Studies on x-ray absorption and diffraction of bone tissue. *Acta anat* 15: 1-22, 1952.
- 7 Engfeldt B and Zetterstrom R. Osteodysmetamorphosis fetalis: clinical pathological study of congenital skeletal disease with retarded growth, hypophosphatasemia and renal damage. *J Pediatr* 45: 125-140, Aug 1954.
- 8 Vincent J. Recherches sur la constitution du tissu osseux compact. *Arch biol Paris* 65 (4): 531-569, 1954.
- 9 Hurley L A and Losee F L. Successful cross species bone grafting accomplished by removal of the donor organic matrix. *Federation Proc* (abstract) 15: 519, Mar 1956.
- 10 Losee F L and Hurley L A. Bone treated with ethylenediamine as a successful foundation material in cross species bone grafts. *Nature London* 177: 1032, June 1956.





## Clinicopathologic Conference

Valley Forge Army Hospital Phoenixville Pa \*

### RECURRENT COMA

**Summary of Clinical History** A 20-year old white man was admitted to this hospital in a semicomatose state. No medical history was immediately available. His friends indicated that he had been out the night before but had not been drinking heavily. On the morning of admission he had gone to work but had not felt well. Later in the day he had returned to his room to rest and at about 1400 hours had been found by friends holding his head as if in pain and mumbling incoherently. During the next day he gradually became more rational, and a medical history was obtained except for the events of the preceding two days, for which the patient had a complete amnesia. Past medical history was noncontributory. During the preceding year he had become interested in hypnotism and had practiced it with his friends. He had been known to make bizarre statements concerning previous existences for example he claimed to have existed in Rome in the year 1 B. C. as a sewer rat.

**Physical Examination** On admission, the patient was stuporous and responded sluggishly. Pulse was 44/min and irregular, temperature 98°F, blood pressure, 110/80 mm Hg, and respirations 12/min. No evidence of trauma was found. The pupils were round and regular and reacted to light. A pigmented chorioretinitis was seen bilaterally. Neurologic examination was negative.

---

Brig Gen Sam F Seeley MC, USA Commanding General From the Pathology Service  
Capt Dale M Schulz MC, USAR Chief

**Laboratory Studies** An electrocardiogram showed sinus bradycardia and sinus arrhythmia. Roentgenograms of the chest and skull were negative. Laboratory findings on admission were within normal limits. Tests for barbiturates and bromides were negative. There was a faint positive reaction for salicylate in the urine specimen. Blood alcohol was below the level of significance.

**Course in Hospital** A spinal puncture revealed an initial pressure of 290 mm of water. Queckenstedt's test was not done. The patient was restless and had to be restrained during the procedure. He responded to painful stimuli but did not become lucid until the day after admission. On the third hospital day he had a mild recurrence of symptoms. He continued to complain of headaches and was transferred to the neuropsychiatric department. A repeat lumbar puncture showed an initial pressure of 600 mm of water. The spinal fluid was clear with 12 cells (2 polymorphonuclear leukocytes and 10 lymphocytes), total protein, 22 mg/100 ml, and sugar, 54 mg/100 ml.

The patient complained of difficulty in focusing his eyes and stated that his headaches had begun with a recent fainting spell. He was not vomiting and did not complain of nausea. On the ninth hospital day he again became comatose, and neurologic examination again failed to reveal any abnormality. During the next week he continued to improve, although his gait was still unsteady. Another lumbar puncture, done while the patient was sedated with Amytal Sodium (brand of amobarbital sodium) showed an initial pressure of 160 mm of water. On the 22d hospital day he was found dead in the bathroom.

## DISCUSSION

**Doctor Bealer** From the data given in the protocol it would seem that the symptoms must represent increased intracranial pressure and the question is to determine the exact cause. The symptoms on admission and those present throughout the hospital course are of a general nature: i.e. confusion, amnesia, headache, syncope, and coma. As an aid in localizing the lesion, only the ataxia, visual blurring, irregular bradycardia, and slow respiratory rate may be of significance and it must be remembered that these may also only represent generalized increased pressure.

In arriving at a tentative diagnosis it might be well first to rule out some of the common causes of such a clinical picture in males in this age group. The first thing that comes to mind is the possibility of trauma and a subacute or chronic subdural hematoma. The history is obviously open to much question and such an injury could well have been sustained; however, the normal roentgenograms of the skull, the absence of signs of trauma, the absence of blood in the spinal

fluid and the normal neurologic findings with no signs of meningeal irritation make this an unlikely diagnosis. Second one might think of some infectious process but opposed to this possibility are the normal spinal fluid, normal routine laboratory findings (in particular the leukocyte and differential counts) the afebrile course and the absence of any foci of infection such as the middle ear sinus or lung. Third I think that the findings of the toxicologic studies plus the routine laboratory work make unlikely such entities as diabetes renal disease drug intoxication et ceteta.

I believe that the two most likely possibilities are brain tumor and hemorrhage the latter probably from an aneurysm. In support of the diagnosis of neoplasm certainly all of the signs of generalized increased intracranial pressure present here would be expected. An increase in the cerebrospinal fluid protein is common as are increased cell counts particularly the mononuclear cells but this does not always occur. The most common single sign in such cases is papilledema which was absent throughout this patient's course. However papilledema is not seen in about 15 per cent of cases particularly if the tumor is of such proximity to the optic foramina as to occlude them. One would expect signs of early optic nerve atrophy however if such were the case. If one were to speculate on the location of the neoplasm the two most striking findings would be the bradycardia with irregularity and the slow respirations. On this basis one might assume the lesion to be in the medulla near the nuclei of the vagus. A very small lesion so critically located might easily account for the relatively short clinical course. Also the possibility of hemorrhage within such a tumor or transient edema might well explain the intermittent nature of the illness.

My second diagnostic choice—hemorrhage probably from an aneurysm—seems unlikely for reasons similar to those given for a subdural hematoma—the normal neurologic findings and absence of signs of meningeal irritation the afebrile course normal spinal fluid, and normal leukocyte count. Also signs of cranial nerve involvement are often present in such instances especially if the aneurysm is in the circle of Willis. An elevated blood pressure might be expected especially if the hemorrhage were sudden and if one postulates that each of the episodes over the 22-day clinical course was due to further hemorrhage. One might expect to see blood pressure changes at these times. Also a chronic subdural hematoma from the rupture of a venous channel between the arachnoid and dura mater must be thought of. It would be possible in such a case to have a normal cerebrospinal fluid with fluctuating signs and symptoms. Papilledema may in such instances be absent.

Doctor Davenport. In essence we have the case of a young man with a negative past medical history who was admitted in coma. The

night before admission he had been drinking, but not excessively. On the morning of admission he awakened stated that he did not feel well but went on duty. During the morning he complained of feeling worse and went to his barracks to lie down where a short time later he was found semicomatose mumbling incoherently and holding his head as if in pain.

The diagnosis of cerebral vascular accident and specifically hemorrhage immediately comes to mind. We must think of primary subarachnoid and subdural hemorrhage. Subarachnoid hemorrhage in the vast majority of instances is due to rupture of an aneurysm. Most aneurysms are of the congenital or "Berry" type but a few are syphilitic, arteriosclerotic or mycotic in origin. At autopsy about 8 per cent of a large series of patients with cerebrovascular accidents will have a primary subarachnoid hemorrhage. Such series show that this lesion appears to have its greatest incidence between the ages of 40 and 50 years. Premonitory symptoms are rare but weeks or months before rupture occurs there may be paralysis of one or more of the cranial nerves due to pressure of the aneurysm. Focal signs are not noteworthy and if they occur are related to the site of the hemorrhage. Generalized symptoms such as headache, vomiting, convulsions and coma are common. Coma as a presenting symptom occurs in 30 per cent of cases. Vomiting occurs in about 50 per cent and headache in almost 100 per cent. With a large hemorrhage the temperature is usually elevated, the pulse rate increased and the rate and depth of respiration altered. The blood pressure is usually elevated. Pupillary findings such as loss of accommodation to light and inequality in size are very common. Stiffness of the neck occurs uniformly. The cerebrospinal fluid is bloody in all patients with primary subarachnoid hemorrhage.

In subdural hemorrhage a history of injury or the presence of contusions or lacerations of the scalp indicative of head injury is important. A period following injury in which the patient is relatively free of symptoms and then lapses into coma is very important in the differential diagnosis. A bloody spinal fluid under increased pressure may occur with either subdural or subarachnoid hemorrhage as may focal neurologic signs, headache, coma and alterations in pulse, respiration and blood pressure. The patient under consideration could from his history have suffered either a subarachnoid or subdural hemorrhage. The diagnosis however could not be substantiated as there were no neurologic signs at admission, the spinal fluid was not bloody and no evidence of cerebral injury could be found by either physical or roentgenographic examination. I do not believe that the history of the patient's interest in hypnotism or the bizarre statements which he had allegedly made are of any significance.

Doctor Hamilton: The striking thing about this patient is the intermittency of his symptoms. However there is no question that these

symptoms were manifestations of increased intracranial pressure. Subdural hematoma, subarachnoid hemorrhage or tumor are all capable of producing increased pressure. In view of nonbloody spinal fluid, the first two possibilities seem unlikely. Therefore an intracranial neoplasm would seemingly be the only other logical explanation for the clinical picture presented in the protocol.

In view of the absence of neurologic signs, it is impossible to precisely localize such a tumor. However, the history of recurrent bouts of coma, headache and syncope suggests two possible sites, namely the third or fourth ventricles.

Tumors of the third ventricle may lie entirely within it, producing few symptoms and signs other than those of increased intracranial pressure. Characteristically, these manifestations differ from those produced by tumors elsewhere by being intermittent. Patients with such lesions may suffer from severe headaches which appear suddenly and which apparently are often precipitated by putting the head in a certain position. At times such pain can be relieved by sudden nodding. These attacks are secondary to a transient hydrocephalus produced by a "ball valve" action of the tumor which suddenly obstructs the flow of cerebrospinal fluid. The blockage is relieved by movement of the head. Such episodes may be so severe that sudden coma and even death may occur.

Tumors of the fourth ventricle, on the other hand, produce increased intracranial pressure early by obstructing the ventricle and seldom give rise to other symptoms until late. Symptoms when present are not marked and may be in the form of unsteadiness of gait or tremor. Frequently, it is impossible to differentiate between a lesion in the fourth ventricle and one in the midline of the cerebellum.

On the basis of the characteristics of tumors located in either the third or fourth ventricle, I am inclined to make as my primary diagnosis an intrinsic neoplasm, possibly a colloid cyst of the third ventricle. I believe that death was probably the result of an acute recurrence of blockage.

Doctor Lucas, from the initial findings and history, one could have postulated that the patient's condition was due to trauma or to some toxic factor such as alcoholism or an overdose of drugs. The subsequent course and findings, such as the initial spinal fluid pressure of 290 mm of water with a second lumbar puncture of 600 mm of water, are suggestive of some cerebellar abnormality. I believe that the third spinal fluid pressure of 160 mm of water cannot be interpreted accurately inasmuch as Amytal Sodium is known to lower the spinal fluid pressure.

When one correlates the patient's apparently worsening state during hospitalization with the increased spinal fluid pressure and the history

of unsteady gait, the question of a tumor of the posterior fossa should be considered. I am unable to account for the cause of the bilateral choriorretinitis and can see no connection between this and such a tumor.

One other comment is that I do not see the necessity for having done repeated spinal taps. With an increased pressure and an associated space-occupying lesion there is the possibility of herniation of the cerebellar tonsils.

Doctor Davenport: Doctor Felton, do you have a comment?

Doctor Felton: I have no other diagnoses to offer and would agree with those suggested, in the order given. The absence of history or evidence of trauma, of localizing neurologic signs, and of signs of toxicity suggests that there was no condition such as subdural or extradural hemorrhage or cerebral abscess.

The protocol up to the last sentence does not particularly indicate that other diagnostic procedures might have been of help. The fact that the patient died suddenly, when associated with the previous findings, points to the intracranial location of his obviously organic disease. In view of this, the findings of carotid arteriograms or pneumoencephalograms would probably have been of considerable help diagnostically. It is doubtful, however, if there was sufficient clinical indication to recommend these studies at the time.

Doctor Van Hoorn: In view of the intermittent character of the symptoms of this patient, which must have originated in the brain or brain stem, it seems possible to me that there had been recurrent bleeding in a tumor. This tumor could be a glioma.

Dr. Sealer's diagnoses:

Neoplasm, possibly in medulla, or ruptured cerebral aneurysm.

Dr. Hamilton's diagnosis:

Neoplasm of third ventricle, possibly colloid cyst.

Dr. Lucas' diagnosis:

Neoplasm of posterior fossa.

#### PATHOLOGIC FINDINGS

Doctor Schulz: The significant pathologic findings were confined to the central nervous system. The brain weighed 1400 grams and the convolutions were widened with narrowing of the sulci. The brain was closely applied to the dura with little or no subarachnoid fluid visible over the vertex. There was no cerebellar pressure cone. The most striking feature grossly was the ballooning of the third ventricle to form a thin-walled cyst 3 cm in diameter. A needle inserted into

the right lateral ventricle withdrew 100 ml of clear cerebrospinal fluid with resulting collapse of the bulging third ventricle

A midline sagittal section made in the fresh state showed slight dilatation of the anterior portion of the aqueduct of Sylvius with occlusion at the level of the inferior colliculus. The lining of the dilated portion of the aqueduct was ragged and slightly injected. After fixation a 2 mm spherical mass could be recognized in the subependymal region of the mesencephalon protruding into and partially obliterating the aqueduct (fig 1). Multiple cross sections of the brain showed none are



Figure 1 Section of mesencephalon showing the spherical tumor in the subependymal region that protrudes into the aqueduct

dilatation of the lateral ventricles, extreme dilatation of the third ventricle, and no abnormalities of the fourth ventricle. The ependymal linings were smooth and glistening.

Microscopically, the tumor was composed of intertwining bundles of fibrillary processes with relatively few nuclei. The cells were distributed irregularly (fig 2) with no evidence of anaplasia and only rare mitotic figures. Sections taken from 1 to 2 mm anterior to the main tumor showed dilated aqueduct with the ependyma interrupted by tufts of proliferating astrocytes and fibrillary processes (fig 3).

This neoplasm belongs to the group described by Boykin and associates<sup>1</sup> as subependymal glomerate astrocytomas. Because of the



Figure 2 Photomicrograph of the subependymal glomerate astrocytoma

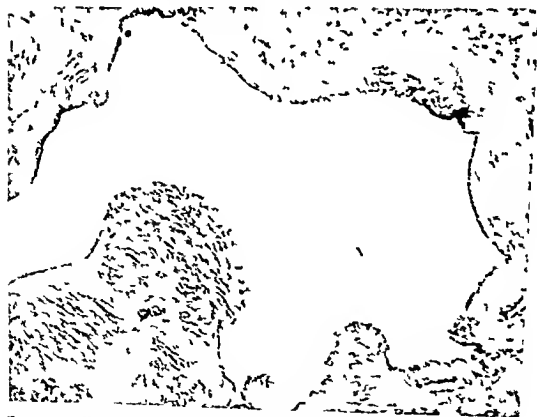


Figure 3 Section of aqueduct showing interruption of the ependyma by tufts of proliferating astrocytes and fibrillary processes



strategic location neoplasms of this type in the aqueduct are probably the smallest that can cause death

#### Pathologic diagnoses

- 1 Astrocytoma (2 mm) of mesencephalon with obstruction of aqueduct of Sylvius
- 2 Dilatation of anterior portion of aqueduct, moderate
- 3 Dilatation of third ventricle extreme of lateral ventricles moderate

#### REFERENCE

- I. B. ykin, F. C. Cowen, D. Isaacson, C. A. J. and Wolf, A. Subependymal glomerular astrocytoma. *J. Neuropath. & Exper. Neurol.* 13: 30-49 Jan. 1954

#### MANAGEMENT OF INTRACRANIAL BLEEDING

The general practitioner and specialist may be called for advice after the catastrophic collapse of an apparently healthy individual. The sudden onset of profound neurological signs and symptoms in such a patient always suggests intracranial hemorrhage. All patients suspected of having intracranial bleeding should be subjected to prompt cerebral angiography to determine the pathological nature of the lesion. In analyzing 100 cases of this type with cerebral angiography a definite vascular malformation was demonstrated in 69 percent. A positive diagnosis as to cause or associated manifestation was made in 85 percent of the cases. While there are certain inherent risks in angiography no additional complications appear to have been introduced into the treatment of intracranial bleeding by having performed the procedure even as early as two hours after the presumed onset of the bleeding. Such risks as may exist seem minor in comparison with the existing risk of the lesion itself. In cases of ruptured aneurysm of the circle of Willis the survival rate following neurosurgical intervention is 75 percent. In a smaller but comparable group those treated by conservative means had a survival rate of 18 percent. Indicated for intracranial bleeding conservative therapy for intracranial bleeding is actually the

—MAURICE L. SILVER, M. D.  
in *Journal of the American Medical Association* P. 1097 March 30 1957

## MENTAL ILLNESS AND CLASSIFIED INFORMATION

MORTIMER V KLEINMANN Jr *Major MC USA*

EDWARD F KRISE, *Captain MSC USA*

THE medical profession and the public are both becoming more sophisticated in their attitude toward mental illness. Almost everyone knows that half of our nation's hospital beds are occupied by the mentally ill. Slow progress is being made toward improving our institutions and there is some evidence that the various legislative bodies are taking cognizance of the problem. However, when a psychiatric disturbance occurs close to home, in the family, in the organization or in someone we know, it is still regarded with fear and sometimes panic.

Nowhere is this more severe than when it occurs in a civilian or military person who has had access to classified material. It is immediately assumed that our entire security is at stake and that local or national secrets are about to be spread abroad for the perusal of enemy agents.

When evaluating a person as a security risk from the psychological standpoint, we are concerned with whether or not an illness or personality deviation exists which impairs his ability or judgment with regard to classified information. Executive Order 10450 states that "an adjudication of insanity, or treatment for a serious mental or neurological disorder without satisfactory evidence of cure" disqualifies a person from receiving a security clearance. Special Regulation 380.160.2 adds the following factors as raising a presumption of a security risk: "conviction for or manifested tendencies of homosexuality, conviction of felonies indicating habitual criminal tendencies, addiction to the use of alcohol or drugs habitually and to excess, without adequate evidence of rehabilitation."

While these orders spell out certain requirements, it usually evolves upon the local physician to determine whether or not these requirements are being met. Such phrases as "serious," "evidence of cure," and "rehabilitation" require considerable individual evaluation and interpretation. Let us consider some

of the more common forms of mental illness from the standpoint of their being security risks

### NEUROSIS

In considering the attributes of neurotic people in general, we do not believe that the presence of a neurosis automatically presupposes the existence of a security risk. We know that the neuroses are internal problems. They are conflicts existing within the individual between his impulses (usually unconscious) and his ability to control them. He may be anxious, he may be hypochondriacal, or he may be compulsive, but he is not disoriented and his conflict is not between himself and the environment. Even in the phobias where the individual responds with inappropriate fears to some situation in the environment we know that these stimuli are symbolic of some unconscious and internal conflict.

Usually the neurotic is a worrier. He expends a great deal of his psychic energy in introspection. Generally, his circle of friends is small because he does not generate the warmth and outgoingness that encourages interpersonal contacts. Frequently he is a very conscientious worker transferring much of his concern and compulsiveness to his job. This is not to say that every neurotic individual should be cleared for every job. On the contrary, there may be many reasons why a neurotic should be denied a clearance. His stress threshold may be low. His hypochondriacal tendencies may cause him to lose much time from important work and his various phobias may definitely limit his flexibility in a particular assignment. On the other hand he may have many skills to offer. In such cases a careful evaluation of the individual in terms of his job would seem indicated.

One might carry the argument further, to a theoretical plane which is beyond the scope of this paper and arrive at the conclusion that in some cases certain types and degrees of neuroses actually reduce the likelihood of an individual's being a security risk. In any event the authors have never seen a case in which the presence of a neurosis resulted in a breach of security.

### PSYCHOSES

The psychoses are an entirely different matter with regard to protecting classified information. When a psychotic condition is found to exist in a patient, the assumption is made that the individual is not responsible for his actions and therefore should not have access to classified material. This assumption is not universally true inasmuch as many a law abiding schizophrenic is earning his living and rearing his family unobtrusively or at times, bearing only the label "eccentric." In general however, one cannot predict the course of a psy

chosis with sufficient accuracy to justify granting a security clearance

Despite the foregoing, an actual breach of security due to the existence of a psychosis is a rarity. In the functional psychoses the patient frequently tends to become markedly withdrawn and isolates himself from other people. Exceptions to this are the manic and certain phases of the paranoid and catatonic schizophrenias. Because it is sometimes difficult to determine the exact type of psychosis which exists early in the disease process, one is never justified in taking chances once the condition is detected. Primarily the psychotic individual (manic, depressed, or schizophrenic) represents a severe actual or potential danger to himself, to those around him, and of course to the military mission of his unit. Because most of these conditions become clinically apparent slowly, forecasting themselves with eccentric behavior, it is usually possible to take the necessary protective measures before serious damage is done.

### TOXIC REACTIONS

The toxic reactions present another picture. They are frequently sudden in onset and may be due to the administration or withdrawal of drugs, the imprudent use or withdrawal of alcohol, some febrile illness such as pneumonia, or more commonly some combination of the foregoing. The patient suffering from a toxic reaction is usually delirious and may babble incoherently. In our experience the combination of pneumonia and withdrawal from alcohol in a person habituated to its excessive use has constituted the most common security embarrassment. It is not necessary to postulate the improbable condition of an enemy agent being present during such an episode to meet the requirements for a breach of security. The dissemination of classified information, even in delirious fragments, to people who have not been properly cleared and briefed, regardless of their loyalty is to be avoided whenever possible.

### CHARACTER AND BEHAVIOR DISORDERS

This group, which includes personality disorders, sexual deviations, and immaturity reactions, represents the most common threat to local and national security. Most of these people look normal and appear to behave in a normal manner most of the time. Many of their deviations from the normal are handled at the unit level without ever coming to the attention of the security officer or the physician. Frequent AWOL's, excessive indebtedness, and more than an occasional brush with the local police may be indicative of an emotional limitation which makes the individual a poor security risk. Less detectable and, therefore, more dangerous, are the tavern braggart, the immature

security guard who must impress his girl friend with his importance and the near deviate who habituates disreputable sections of town "just for kicks." The undetected homosexual is regarded as a risk not so much from the danger of his being blackmailed although this exists but because of the rapidity with which he may make strong emotional attachments to persons of short acquaintance.

Most people live double lives within themselves, satisfying their aggressive needs and frustrated desires through phantasy and sublimation. The people in the character and behavior disorder group tend to act out their impulses much as the child does when he plays cops and robbers or fancies himself as the current western hero. The blend of phantasy and reality can be so subtle that the individual may be hard pressed to separate them resulting in remarkably poor judgment as to what is possible and what is not or what is safe and what is unsafe. This frequently results in a legal controversy over whether or not these people are responsible for their actions. It is generally believed that they are, but each case must be judged on its merits. The important thing is that people in this group are usually not detected until after they have been assigned sensitive jobs and may have already compromised the security of their unit.

#### EARLY TREATMENT

The physician who first sees a mentally disturbed person who has had access to classified material is called upon to answer several important questions. What condition does the patient have? How serious is it? How long may it be expected to last? Does it constitute a security risk and if so what special precautions are indicated? Most important is the decision as to how the case is to be handled from the very beginning.

**Neuroses.** The patient who is suffering from a neurosis will frequently present himself voluntarily to the physician with his emotional problem or after adequate evaluation of the patient's organic complaints the physician may decide that the problem lies in the emotional sphere. Very often the patient has already suspected this or accepts it after brief token resistance during which he says, "But surely my emotional problems couldn't cause my chest pain" or "But doctor this pain is real. I'm not imagining it." The doctor's genuine acceptance of the pain as real and his firmly expressed opinion that emotional disturbances can cause the patient's symptoms may be all that is necessary to orient the patient toward the cause of his illness. Certainly some patients will reject this concept completely and insist that an organic cause must be found. The physician who allows himself to be duped into performing numerous physical examinations and repeated laboratory pro-

ceduros only serves to reinforce the patient's opinion that he, indeed, has some physical illness

In those cases where the patient recognizes that he has an emotional problem and is ready to talk about it, another difficulty arises. The patient's security clearance may be higher than that of the physician. The therapist must then inform the patient that this situation exists and insist that nothing of a classified nature be brought up. This problem is more apparent than real since in most people the difficulty has existed for some time and rarely relates to a specific job. This is particularly true when the job is highly specialized and the patient is an expert in his field. It is less applicable when the job is routine and the patient relatively untrained as in the case of a security guard whose job "gets on my nerves." Usually the largest portion of the difficulty will be found to lie in the realm of interpersonal relationships between the patient and people who have had an important influence on his personal life such as parents, siblings, wife, et cetera.

The physician who has not had psychiatric training will certainly not wish to embark upon a course of long term psychotherapy. His prime motive is to ameliorate the patient's distress sufficiently to allow him to remain at his job. Frequently this may be accomplished by merely affording the patient the opportunity of discussing his problems in confidence with someone whom he knows is not going to reveal what is said during the interview. Very often confused issues are clarified remarkably when the patient is required to put into words what had once been vague concepts and unexpressed and diffusely felt hostilities. Through all this the doctor plays the role of a listener. He does not enter into an active critique of the patient's thoughts or activities. He certainly does not play God and offer specific advice about such things as marriage, divorce, or change of jobs or career fields. These are decisions the patient must make for himself when he has attained a better understanding of the factors involved.

Even if the therapist admits that a plan proposed by the patient appears to be reasonably sound, in the event of failure this may come home to roost as a direct accusation that the plan was specifically suggested and encouraged by the doctor. Principally the doctor just listens and may occasionally point out the apparent existence of mixed feelings which seem to be contributing to the patient's difficulties. This is not psychoanalysis. It does not deal with basic unconscious drives or the Oedipus complex. This listening type of therapy is designed solely to allow the patient to express his feelings accurately so that they become clearer to him and thus easier to deal with.

Not all cases are amenable to this type of therapy and the physician must particularly avoid any dramatic techniques in which he attempts in one or two interviews to reveal to the patient the "deep, underlying, unconscious" cause of his neurosis. Usually he will fail to impress the patient at all but occasionally he may uncover material which he is not competent to handle and do serious harm to his patient. In any case where the physician feels that the patient's illness seriously interferes with the performance of his duties or the physician doubts his own ability to handle the situation he has no other course but to recommend transfer to a general hospital with neuropsychiatric facilities. As long as the patient is well oriented and responsible for his actions no special security measures are indicated beyond notifying the security control officer of the patient's admission to the hospital and proposed transfer so that de briefing can take place and a replacement obtained if necessary.

**Psychoses.** The psychotic patient presents a simplified but sometimes urgent problem. As long as he is in a psychotic state and not responsible for his actions he must be regarded as a security hazard. He must be isolated and attendants provided. The security officer should be notified so that appropriate steps can be taken to protect confidential material or information for which the patient was responsible such as codes, safe combinations, keys and passes to restricted areas et cetera. It is also necessary to brief attendants regarding their responsibilities toward any classified information to which they may be exposed.

Within a short time after admitting the patient the physician will be required to express an opinion as to the severity of the illness, the likelihood of the patient returning to duty in a short time, a long time, or never, and finally as to whether the current illness represents a security hazard in regard to future assignments. The question of arranging an emergency transfer of the patient to a general hospital will also arise and may seem to require an urgent decision.

The answers to these questions will be determined for the most part by (1) the clinical state of the patient and (2) the physician's diagnosis. It is possible that the doctor's own anxieties about mental illness and the bizarre forms in which these conditions present themselves may lead him to attempt a rapid diagnosis and disposition of the case. A reasonably thorough physical examination and a good history taken from the patient, his relatives, associates, and superiors will do much to reduce the confusion and assist in charting a course. The desire of the physician is to help the patient and in the cases we are discussing to protect security as much as possible. Rapid transfer of these patients may not do this and indeed

may only serve to increase the security hazard by exposing the patient to numerous other people with inadequate clearance

An early, but tentative, decision should be made concerning whether the patient's mental aberration represents a primary psychiatric process such as schizophrenia or a manic depressive psychosis or whether it is secondary to some other condition of an infectious, toxic, or cardiovascular nature, et cetera. If the patient belongs to the latter group, treatment directed at the basic illness will usually alleviate the psychiatric symptomatology to the extent that the patient need not be evacuated as a psychiatric case and may not require evacuation at all. Most toxic reactions are of short duration and subside as the fever comes down, the basic infection is brought under control, or a reasonably normal physiologic balance is restored. Every city hospital and almost every physician has a favorite "cocktail" which is administered to the patient suffering from delirium tremens or alcoholic hallucinosis. These have largely been replaced by the ataractics which are reasonably safe and rapid in action. By using their sedative effect the physician allows himself time to evaluate his patient more critically and is in a better position to decide on the necessity of a transfer.

In the case of the alcoholic, where the doctor cannot give reasonable assurance that the condition will not be repeated, it may be necessary to transfer the patient to another post. However, the ends of security may be better served if the patient is given a less sensitive job within the original organization, provided he is able to perform other tasks satisfactorily.

In the case of the functional psychoses, particularly the schizophrenias, ultimate transfer to a general hospital should be planned. Admittedly, the physician in the station hospital or outlying medical installation is faced with a real problem when he attempts to provide care for a psychotic patient without closed ward facilities. The absence of an adequate restraint section and trained closed ward personnel may seem to present an overwhelming problem, the only answer to which is heavy sedation of the patient and immediate transfer out of the area.

Here again, the need for haste may be more apparent than real. Although the psychotic is considered to be mentally incompetent, large areas of his personality frequently remain intact. This is particularly true in the early stages of the illness at the time when the doctor in the station hospital is most likely to see the patient. A kindly, accepting, and professional attitude may do much to calm an anxious and hostile patient and may make the difference between a patient who can be handled routinely and one who throws the area into a turmoil and taxes the abilities of all concerned.



Not all cases are amenable to this type of therapy and the physician must particularly avoid any dramatic techniques in which he attempts in one or two interviews to reveal to the patient the "deep, underlying, unconscious" cause of his neurosis. Usually he will fail to impress the patient at all but occasionally he may uncover material which he is not competent to handle and do serious harm to his patient. In any case where the physician feels that the patient's illness seriously interferes with the performance of his duties or the physician doubts his own ability to handle the situation he has no other course but to recommend transfer to a general hospital with neuropsychiatric facilities. As long as the patient is well oriented and responsible for his actions no special security measures are indicated beyond notifying the security control officer of the patient's admission to the hospital and proposed transfer so that debriefing can take place and a replacement obtained if necessary.

**Psychoses** The psychotic patient presents a simplified but sometimes urgent problem. As long as he is in a psychotic state and not responsible for his actions he must be regarded as a security hazard. He must be isolated and attendants provided. The security officer should be notified so that appropriate steps can be taken to protect confidential material or information for which the patient was responsible such as codes, safe combinations, keys and passes to restricted areas, et cetera. It is also necessary to brief attendants regarding their responsibilities toward any classified information to which they may be exposed.

Within a short time after admitting the patient the physician will be required to express an opinion as to the severity of the illness, the likelihood of the patient returning to duty in a short time, a long time, or never, and finally as to whether the current illness represents a security hazard in regard to future assignments. The question of arranging an emergency transfer of the patient to a general hospital will also arise and may seem to require an urgent decision.

The answers to these questions will be determined for the most part by (1) the clinical state of the patient, and (2) the physician's diagnosis. It is possible that the doctor's own anxieties about mental illness and the bizarre forms in which these conditions present themselves may lead him to attempt a rapid diagnosis and disposition of the case. A reasonably thorough physical examination and a good history taken from the patient, his relatives, associates, and superiors will do much to reduce the confusion and assist in charting a course. The desire of the physician is to help the patient, and, in the cases we are discussing, to protect security as much as possible. Rapid transfer of these patients may not do this and indeed

advance of the patient's arrival. Alerting the security officer at the general hospital to which the patient is being transferred helps to reduce the possibility of a security break after the patient has lost the control of his own medical unit.

The handling of the psychotic patient at the local installation may be summed up as follows:

1. Attempt to bring the acute phase under control prior to transfer.

2. Work closely with the local security officer with particular regard to the selection and briefing of attendants and the protection of any classified information or material to which the patient may have had access.

3. Alert the receiving installation as to the situation both through medical and security control channels.

**Character and Behavior Disorder Group** The role of the medical service in the handling of personnel with character and behavior disorders would appear to be rather poorly defined. Administrative methods of disposition recommended by boards convened under the provisions of AR 635 208<sup>1</sup> and AR 635 209<sup>2</sup> frequently bypass medical channels, and if the physician is asked to see these cases it is usually only for the purpose of ruling out any condition which might warrant the individual's appearance before a medical board. By the time the doctor is consulted, the subject may have been involved in sensitive work for many months or even years. The man's commanding officer has had to wait until the individual's transgressions or inaptitude has not only become readily apparent through repeated actions but has also resisted the required attempts at rehabilitation.

In routine military assignments the above procedure has demonstrated its value, but where security information is involved it may not be feasible to wait so long. Early detection of those persons who represent potential security hazards because of personality patterns can be facilitated by a little extra effort on the part of the local physician. The commanding officer of any unit charged with a sensitive military mission is certainly going to be receptive to any reasonable procedure or policy which enhances his security control. The doctor, through contact with unit commanders, should encourage the early referral of those servicemen and civilians who show evidence of poor personality traits such as immaturity, frequent AWOL's, apparent inability to handle routine personal problems, excessive indebtedness, and difficulty with the local police.

In many cases a recommendation for will not be indicated, but a transfer to a less

Not infrequently the patient has suspected that something was wrong for some time and although frightened and suspicious, is anxious for help and will move in a positive and co-operative manner toward the physician who offers protection and assistance. For this reason the use of subterfuge should be scorned. A straightforward and honest approach is indicated. Within the limits of his ability to comprehend, the patient should be advised as to what is being done for him. In answer to his questions concerning his isolation and the presence of attendants, he can be told frankly that the doctor believes that he is emotionally upset at the present time and that this arrangement is considered necessary.

To the uninitiated it might seem that this would be just the thing to set the patient off on a wild attempt to escape. Experience indicates the contrary. Since the patient is extremely sensitive to all that is going on about him he will be quick to sense an honest approach and although he may disagree with the doctor's opinion he will feel better able to cope with what he considers to be an honest error rather than something he thinks is a plot to incarcerate him.

Sedatives may be necessary and should be selected and used with due regard to the physical condition of the patient. Barbiturates particularly amobarbital sodium given intravenously, can be used to calm the very hyperactive patient, but the physician should not be surprised to discover that even an anesthetic dose has only a short effect. Of the newer drugs, promazine hydrochloride given in adequate dosage is the author's choice. Large doses are to be avoided in the hypertensive or cardiac patient. In the otherwise healthy patient the drug is generally considered to be quite safe and the rapid administration of the necessary dosage may be attempted. We start with 100 mg of promazine given orally or 50 mg intramuscularly every two hours until the desired effect is obtained. Between doses the patient is watched carefully for signs of excessive drowsiness or a precipitous fall in blood pressure. Clinical improvement is frequently obtained with the first dose. If the patient shows no untoward response to the drug initially the dosage schedule may be accelerated as necessary. When it has been established that the patient tolerates the drug well, intramuscular administration of higher doses can be used when a very rapid or more pronounced effect is desired.

Once the acute phase has been brought under control the physician may begin making realistic plans for the transfer of his patient. The degree of security information involved may well determine the place to which the patient is transferred and the method of transportation. The receiving installation should certainly be advised of the situation well in

advance of the patient's arrival. Alerting the security officer at the general hospital to which the patient is being transferred helps to reduce the possibility of a security break after the patient has left the control of his own medical unit.

The handling of the psychotic patient at the local installation may be summed up as follows:

1. Attempt to bring the acute phase under control prior to transfer.

2. Work closely with the local security officer with particular regard to the selection and briefing of attendants and the protection of any classified information or material to which the patient may have had access.

3. Alert the receiving installation as to the situation both through medical and security control channels.

**Character and Behavior Disorder Group.** The role of the medical service in the handling of personnel with character and behavior disorders would appear to be rather poorly defined. Administrative methods of disposition recommended by boards convened under the provisions of AR 635 208<sup>1</sup> and AR 635 209<sup>2</sup> frequently bypass medical channels, and if the physician is asked to see these cases it is usually only for the purpose of ruling out any condition which might warrant the individual's appearance before a medical board. By the time the doctor is consulted, the subject may have been involved in sensitive work for many months or even years. The man's commanding officer has had to wait until the individual's transgressions or inaptitude has not only become readily apparent through repeated actions but has also resisted the required attempts at rehabilitation.

In routine military assignments the above procedure has demonstrated its value, but where security information is involved it may not be feasible to wait so long. Early detection of those persons who represent potential security hazards because of personality patterns can be facilitated by a little extra effort on the part of the local physician. The commanding officer of any unit charged with a sensitive military mission is certainly going to be receptive to any reasonable procedure or policy which enhances his security control. The doctor, through contact with unit commanders, should encourage the early referral of those servicemen and civilians who show evidence of poor personality traits such as immaturity, frequent AWOL's, apparent inability to handle routine personal problems, excessive indebtedness, and difficulty with the local police.

In many cases a recommendation for administrative discharge will not be indicated, but a transfer to a less sensitive position

within the unit or even to another area may be in order. The screening of all incoming personnel would put an excessive burden on the doctor and is not practical, but the selective interviewing of those individuals whose previous performance suggests that they may fall into the groups we are discussing will undoubtedly increase the integrity of the unit with regard to protecting classified information. It is certainly consistent with the responsibility of the physician that he work closely with his commanding officer and the security officer in the protection of his unit through the early detection and elimination of those people who represent actual or potential security risks.

### SUMMARY

Mental illness represents a threat to national security and often poses a difficult problem in medical management.

The presence of a *neurosis* does not presuppose the existence of a security risk. Only through careful evaluation of the manifestations of the illness in relation to the demands of the job can the existence of a security threat be determined.

Because the course of a *psychosis* cannot be predicted with accuracy, psychotic patients should be relieved of their security clearance even though an actual break of security due to the existence of a psychosis is, in our experience a rarity.

Persons suffering from *character and behavior disorders* represent the most common threat to national security when placed in sensitive positions. The early identification and effective administrative management of such patients through the close co-operation of physician unit commander, and security officers can reduce the hazards associated with these disorders.

We have emphasized the importance of early treatment, the danger of rapid and poorly planned evacuation, and the necessity for integration of the skill of the physician and the function of the security officer. Basic psychological and medical techniques that may be employed by the physician who is faced with the problem of mental illness in patients who have access to classified information have been suggested.

### REFERENCES

- 1 Personnel Separation - Discharge - Undesirable Habit and Traits of Character AR 635-208 21 May 1956.
- 2 Personnel Separation - Discharge - Inadequate or Unstability AR 635-209 17 Mar 1955

# FLIGHT INDOCTRINATION PROGRAM

At a United States Marine Corps Air Station

RUSSELL G WITWER *Captain MC USN*

**T**WO years ago a new program of aviation selection was instituted at this activity in an attempt to lower the high attrition rate of U S Marine Corps aviation candidates in the Naval Air Training Command. There are many variables that enter into attrition rates, but the results achieved to date must be considered most favorably.

Under the old regime, various categories of flight applicants were ordered to the U S Naval Air Station, Pensacola, Fla., from all sections of the United States, upon successful completion of their flight aptitude tests and flight physical examinations. At present, the majority of Marine Corps aviation candidates, Regular or Reserve, are processed at this air station prior to receiving orders for flight training. Those of officers and men are obtained from several sources which include:

1 Unrestricted commissioned officers who have successfully completed, or are in attendance at, a Basic Course at the Marine Corps Schools, Quantico, Va., at the time of application.

2 "Platoon Leaders Class (Aviation)" program consisting of college students who receive two six week periods of training prior to their senior year of college during two summer vacations from college. Those who desire flight training are administered flight physical examinations, flight aptitude tests, and further indoctrination as outlined in this article during the second six week training period. After graduation from college and when commissioned, they are ordered to report to this air station in order that their physical qualifications may be reaffirmed.

3 Aviation officer candidates, who are recent college graduates and who receive at Marine Corps Schools, Quantico, a 10 week training course leading to a commission, followed by assignment to flight training.

4 Enlisted personnel selected for assignment to flight training who are assigned to the Marine Corps Schools.

---

From U S Marine Corps Air Station Quantico Va

Candidates from any of these sources who fail to qualify are immediately returned to their nonaviation duties without undue loss of time or money. Those who do qualify are ordered to Pensacola for training as student naval aviators for a period of about 18 months.

A complete flight physical examination including refraction, is given to all applicants, even though they have been previously qualified. During the 24 months covered by this report 41 such candidates were rejected for physical defects. Causative factors in most instances have been (1) the lengthy interval between time of original examination and reporting here, (2) hasty examinations, possibly due to the pressure of recruiting programs, and (3) previous passing of some applicants following eye exercises\* from civilian sources.

The U S Navy Aviation Selection Tests<sup>1</sup> are given to those candidates not having previously passed them provided that an interval of at least one year has elapsed since a previous failure as well as to those who have never given the tests. These written examinations take about three and one half hours to complete and are preceded by a brief explanatory talk by a flight surgeon. They consist of

1 Aviation Qualification Test, which is primarily a test of general intelligence

2 Flight Aptitude Rating Battery (FAP), which is divided into three different written tests: (a) The Mechanical Comprehension Test which deals with the ability of the individual to perceive physical relationships and handle familiar concepts of everyday mechanics rather than technical matter found in textbooks. This test has been found to be most useful in predicting success in the flight training program. (b) Spatial Apperception Test designed to measure ability to visualize the relationship between the attitude of a plane and the territory over which it flies. (c) Biographical Inventory, an untimed questionnaire containing elements of personal history, expressions of interests and attitudes and selected informational items that have been found to differentiate between passing and failure groups. Those receiving passing grades in the Selection Tests are then scheduled for a flight physical examination at the rate of 20 a day until each group is completed.

Upon final approval by the Bureau of Medicine and Surgery, those found to be physically qualified and aeronautically adapted for duty involving flying are scheduled to receive four indoctrination flights each of one hour duration in the T 34 training aircraft. The purpose of this flying is to minimize attrition of Marine officer students at Pensacola. It does so in two ways. First, it lets the applicant experience the sensations and problems of single engine aircraft flying thereby shaping his own

decision—"You like it." Second, it provides the Marine Corps Schools Flight Interview Board with more basis for its recommendations concerning the applicant's suitability—"It likes you."

Flights are preceded by a briefing on emergency and cockpit procedures, and include rudiments of ground operations and fundamental flight maneuvers. Applicants follow through on controls. Aerobations or abrupt maneuvers are forbidden. The pilot reviews each flight with the applicant, then writes up the applicant's reaction to what he has experienced.

The fourth and final step is the meeting with the Flight Interview Board which is chiefly concerned with the determination of the motivation of the applicants for flight training. It indicates by endorsement, on each application, its recommendation in this regard to the Commandant, U S Marine Corps. It is noted that the academic and leadership performance of those applicants in, or graduates of the Basic Course, Marine Corps Schools, are considered by the Board as a direct reflection of his motivation.

From February 1955 through February 1957, a total of 1,733 flight applicants were examined by this medical department. Of these, 904 (52.16 per cent) were found to be physically qualified and received passing grades in their Flight Aptitude Tests. (Over 1,100 flight physical examinations having no connection with this program were also conducted during the two-year period.)

Of the 904 candidates accepted medically, 41 (4.53 per cent) voluntarily withdrew prior to their first flight and 63 (6.96 per cent) voluntarily withdrew following one or more flights. Of the remaining 800 applicants, 101 (11.37 per cent) were rejected by the Flight Interview Board. Of the physically qualified candidates, 684 (75.66 per cent) completed indoctrination flights and were finally accepted by the Flight Interview Board. The slight difference in final totals can be explained by the fact that a few candidates were either not recommended for commission, were hospitalized for illness or injury, or were subsequently rejected by the Bureau of Medicine and Surgery.

Most frequent reasons given by those who dropped at their own request were (a) loss of interest, (b) family opposition, (c) decision not to extend their period of active duty, and (d) the extensive time element required for flight training.

#### CONCLUSIONS

Testimony has been given to Congress by the services' witnesses, as far back as 1955, that the cost of flight training is estimated to be about \$120,000. Informal estimates from the Flight Training Command indicate that the direct cost of pro-



dueing a naval aviator is approaching \$115 000 A total of 220 candidates either withdrew voluntarily or were rejected by the Flight Interview Board 41 additional applicants who had previously passed their flight physical examinations were rejected by the Quantico medical department

Assuming that all 261 candidates not qualified would have been eliminated during the early stage of their flight training, a great monetary saving to the Government would be represented. It is quite conceivable that some of the candidates would advance to later stages of training at even greater cost. In addition, much reduction in lost time waste of manpower, and inconvenience to all concerned is represented. As previously stated those who fail during any one of the four stages of this indoctrination program are immediately returned to their original place of duty.

The U S Marine Corps recruiting program also has apparently been assisted by the enthusiasm of the members of the Platoon Leaders Class following their brief experience with aviation. The best judges are the procurement officers in the field, and they contend that they are helped immeasurably by the interest created not only among those given the flights but also in the number of friends influenced by the candidates.

The final attrition rates for the years 1955 and 1956, based upon 16 to 18 months of training have not been completed. In summary we can only quote the following excerpts from a special Report issued by the U S Naval School of Aviation Medicine.

"Differences in the over all attrition rates are actually reflections of the difference in the DOR (dropped on request) rate among various groups. Although there are few variations in rates between groups for other types of attrition none of these variations is significant. The significant differences among the groups are for voluntary withdrawals only.

\*Another figure which stands out is the relatively low Marine Corps officer DOR rate since they were at one time a high DOR group in comparison with other Ols (officer under instruction). Apparently their screening and flight indoctrination program has paid off in reduced attrition."

We are of the opinion that the Marine Corps attrition rate will be even lower when the final results of the past two years flight training have been ascertained. This low rate is a result of more rigid adherence to flight physical examination standards giving candidates an opportunity to actually experience basic flying and careful screening prior to assignment to flight training.

## REFERENCES

- 1 Naval aviation selection tests. In *Aviation Medicine Practice* prepared by the Bureau of Medicine and Surgery published by Bureau of Naval Personnel NAVPERS 10839-A Government Printing Office Washington, D. C. 1955 pp 143-144
- 2 Bair J T and Ambler R A. Differences in Attention Rates by Origin of Commission. Special Report No 36-31 U S Naval School of Aviation Medicine Naval Air Station Pensacola Fla 6 Dec 1956

## WHAT PRICE PEACE OF MIND?

"It is a rapidly moving world we live in growing more and more complex year by year. Great social changes are going on. The improvements in communication have exposed each of us to many new stimuli. If we cannot react to them satisfactorily they call forth in us anxiety and hostility. An increasing number of people cannot enjoy being quiet and undisturbed and alone.

"In order to adapt successfully to this new world one must take thought. One must know one's self. One must contemplate with some objectivity his relationships with other persons and learn to understand his own reactions. Many will need the help of psychiatrists to accomplish this.

"If we take the easy way and merely "tranquilize" our patients with new or old drugs we may seduce them into a bogus health but it will weaken their adaptive capacities. Our patients will lose some of the keenness needed to live in this accelerated world there may be more traffic accidents and the cult of relaxation may degrade our morale. If we psychiatrists surrender to this easy kind of therapy and give up the careful study of our patient's problems we might as well let the manufacturers of the "tranquilizers" contract with the municipalities to put tons of drugs into the reservoirs of drinking water. Then everybody will relax.

"No psychiatrist would subscribe to such a ridiculous notion. Our aim is to make patients responsible and at peace with themselves. For those patients capable of adaptation there are no cheap wholesale shortcuts. Lasting peace of mind can be bought only dearly, by self knowledge."

—Editorial

*in American Journal of Psychiatry*  
P 663-664 Jan 1957

## CASE REPORTS

### Larval Granulomatosis

Diagnosis by Needle Biopsy of the Liver

OGDEN C. BRUTON Colonel MC USA  
WILLIAM J. JAFFURS Captain, MC USA

**L**ARVAL GRANULOMATOSIS (visceral larva migrans) as a clinical entity causing extreme degrees of eosinophilia associated with visceral granulomatosis in children ingesting polluted soil is well documented. The dog and cat ascarides have been thought to be the main offenders, however other larval forms not accustomed to the human host in their normal life cycle have also been identified. The diagnosis of the condition may be strongly suspected from routine clinical data, however the diagnosis can only be made by finding the larvae in body tissues. Usually the liver has been the tissue studied ante mortem, although the brain, lung, heart and other organs have harbored the larvae in post-mortem specimens. Liver tissue has been obtained for such study during abdominal exploration. It has been stated that the diagnosis will be infrequently made "as long as laparotomy is the only means of specific diagnosis." The ease with which liver needle biopsy in children may be done has been pointed out, and its use in suspected larval granulomatosis is demonstrated by the following case report.

#### CASE REPORT

A two year-old boy was admitted to the hospital with fever, cough, general malaise and enlargement of the abdomen of one month duration (fig. 1). There were four siblings three to eight years of age in good health. The mother had allergic rhinitis. The father was overseas and in good health. When the mother delayed coming to the hospital a home visit revealed the family to live in a rural filth. Several dogs of various ages were owned by neighbors although the boy's family had no pets. The patient was said to spend much of his playtime picking dirt from between the cracks in a paved walkway and eating it.

The patient had pneumonia six months prior to admission which lasted a month and appeared to respond completely with the use of antibiotics.

From Tripler U S Army Hospital APO 438 San Francisco Calif and Walter Reed Army Hospital Washington D C

**Physical Examination** On admission the patient appeared both acutely and chronically ill, with a prominent abdomen caused by an enlarged spleen and liver, which were 6 and 5 cm below the costal margin. The nasal mucous membranes were wet and swollen and appeared to be of the allergic type. The tonsils were large and hyperemic with exudate on both. There were coarse rales and rhonchi throughout both lung fields. The fundi were normal.



*Figure 1 The abdominal enlargement is obvious in this photograph of the patient. The liver and spleen have been outlined on the abdomen.*

**Laboratory Findings.** The white blood cell count was 48,000 per  $\mu$ l with a differential count of 13 per cent neutrophils, 21 per cent lymphocytes, 65 per cent eosinophils and 1 per cent basophils. Hemoglobin was 8.7 grams per 100 ml. Bleeding time, coagulation time, platelet count, urinalysis and blood culture were normal or negative. The total serum bilirubin was 0.4 mg per 100 ml. cephalin-cholesterol flocculation, negative, thymol turbidity, 9 units, alkaline phosphatase, 9.2 Bodansky units and total blood protein 10.2 grams per 100 ml were

albumin 2.7 grams giving an albumin-globulin ratio of 0.4. Electrophoretic analysis of the blood serum proteins gave a total of 9.48 grams per 100 ml with 4.5 per cent albumin, alpha globulin 3.5 per cent, alpha<sub>2</sub> 8.3 per cent, beta 9.8 per cent, and gamma globulin 33.8 per cent. Stool specimens contained no blood, ova, or parasites. Skin tests for tuberculosis, histoplasmosis, coccidioidomycosis, and blastomycosis were negative. A study of the bone marrow was interpreted as showing hyperplasia with marked increase in the number of eosinophils and eosinophilic precursors.

**Course in Hospital.** On penicillin and streptomycin therapy the patient's acute respiratory signs and symptoms subsided rapidly. The clinical impression was that this child represented a rather typical example of granulomatosis caused by visceral larva migrans. Accordingly, one week after admission when his acute respiratory infection had subsided a liver needle biopsy was performed. The biopsy specimen revealed multiple granulomas (fig 2) in various stages of develop-

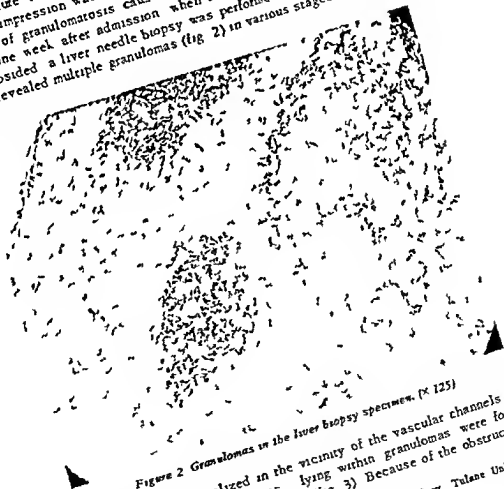


Figure 2 Granulomas in the liver biopsy specimen. (X 125)

ment apparently localized in the vicinity of the vascular channels. A few larvae of *Toxocara canis* lying within granulomas were found after many sections were searched (fig 3). Because of the obstructive

Identified by Dr. Paul C. Beaver, Prof. of Parasitology, Tulane University School of Medicine.

nature of the tonsils he had an uneventful tonsillectomy and adenoidectomy before his discharge one month after admission. There was no change in his white blood cell count or eosinophilia, and his spleen and liver remained enlarged. No specific treatment was attempted. Measures to prevent more infection were strongly advised at the time of discharge.



Figure 3 *Toxocara canis* larva in liver ( $\times 450$ )

**Subsequent Course** Follow up investigation one year after study found the family still living in circumstances conducive to continued infection. The patient's liver was 2 cm below the costal margin and the spleen 3 to 4 cm. A roentgenogram of his chest was reported as normal. His white blood cell count was 18,200 per  $\mu$ l with a differential count of 22 per cent neutrophils, 33 per cent lymphocytes, and 45 per cent eosinophils. The hemoglobin was 10.8 grams per 100 ml.

#### DISCUSSION

That certain parasites are unable to continue their life cycle in a foreign host and spend their life meandering through various tissues is a fascinating story. However, it becomes disturbing when one suspects the probable widespread casual infection in man, with or without clinical manifestations. That this high

degree of casual infection does exist is supported by studies revealing a majority of cats and young dogs harboring parasites<sup>1</sup> and the almost universal close association of man with these animals with little thought of prevention of infection. In a 10-month period, June 1955-March 1956, 61 of 169 (36 per cent) dog stool specimens examined at the Hawaiian Medical Laboratory, without regard to age or clinical condition of the dog, were found positive for some intestinal parasite.<sup>2</sup>

It seems entirely probable that some unexplained neurologic disorders in children are caused by these infections. It has not been determined with certainty that mild infections in nonallergic individuals produce the typical clinical picture as in the case reported. Certainly in the past larval granulomatosis has not always been differentiated from familial eosinophilia, eosinophilic leukemia, Loeffler's syndrome, retinoblastoma and endophthalmitis. The finding of an eosinophilia greater than 20 per cent and a history of eating dirt should suggest the diagnosis. Other symptoms relative to the respiratory tract, central nervous system and an enlarged liver and spleen further support the diagnosis. A liver biopsy showing granulomas along with the clinical picture would appear to furnish a presumptive diagnosis, although the specific etiologic diagnosis can only be made by identification of the larva. The small size of the parasite and the few sections usually made from a biopsy specimen make the finding of the parasite unlikely. Complete sectioning of the specimen in a heavy infection, as in the reported case, increases the likelihood of identification.

#### SUMMARY

A two-year-old boy with a history of eating dirt was found to have an enlarged liver and spleen, white blood cell count of 48,000 per  $\mu$ l (65 per cent of which were eosinophils) and a total serum protein of 9.48 grams per 100 ml (33.8 per cent of which was gamma globulin). A liver needle biopsy revealed many granulomas and several larvae identified as *Toxocara canis*. It is believed that liver needle biopsy is a safe method of proving the diagnosis of larval granulomatosis.

#### REFERENCES

1. Smith, M. H. D. and Beaver, P. C. Visceral larva migrans due to infection with dog and cat ascarids. *Pediatr Clin, North America* 16:168, Feb. 1953.
2. Muhlisen, J. P. Demonstration of pulmonary migration of causative organism of eczema eruptiva. *Ann. Int. Med.* 38:595-600, Mar. 1953.
3. Smith, M. H. D. and Beaver, P. C. Persistence and distribution of toxocara larvae in tissue of children and mice. *Pediatrics* 12:49-496, Nov. 1953.
4. Karpinski, F. E., Jr., Everett, Stuart, E. A. and Sawitz, F. G. Larval granulomatosis (visceral larva migrans). *A. M. A. J. Dis Child.* 92:34-40, July 1956.
5. Bruto, O. C., Metzger, J. F. and Spitzer, H. Experience with needle biopsy of liver in infants and children. *Pediatrics* 16:836-841, Dec. 1953.
6. Editor's note in abstract of: Letter 3. In Gell, S. S. (editor). *The Year Book of Pediatrics* 1954-1955. The Year Book Publisher, Chicago, Ill. 1954, pp. 109-111.
7. Dietrich, W. H. Personal communication.

of Isuprel 1:200 solution, in 5 ml of Alevaire nebulized with compressed air under a positive inspiratory pressure around 18 cm H<sub>2</sub>O. Expiration was allowed to take place passively. Prior to the start of this treatment he appeared his usual self, exhibiting the usual labored breathing but with no suggestion of critical respiratory impairment. He seemed composed and free of any manifest anxiety or apprehension.

After 4 to 5 minutes of treatment a critical change in his status was obvious. He became severely dyspneic, experienced a sensation of suffocation and had to withdraw from the face mask. He appeared cyanotic. A wild, frightened apprehensive expression was evident. There was no complaint of chest or precordial pain. He was coherent. He remarked that the treatment was not helping him as it usually did. After a pause of a minute or two he appeared to improve, so the face mask was replaced and the procedure was continued. After a period of 1 to 2 minutes he removed the face mask again because of increasing dyspnea. His anterior thorax was now markedly elevated and appeared to be "trapped" in an advanced inspiratory position. He was deeply cyanotic and gasped desperately for air. His face was again distorted by a wild, frightened stare. His respirations were shallow with evident use of the accessory muscles. His lips were pursed during expiration. The radial pulse rate was 160, weak and difficult to elicit. His blood pressure was 110/60 mm Hg (one hour later on the ward blood pressure had risen to 160/90). The cervical veins were greatly distended in the sitting position. Heart sounds were distant. Cardiac rhythm was regular. Abundant moist rales and expiratory wheezes were heard throughout both lung fields. He had 3+ pedal edema. The liver was easily palpable below the costal margin.

The patient was taken to the ward where the following measures were instituted: oxygen by tent, extremity tourniquets, aminophylline intravenously, Dicumarol (brand of bishydroxycoumarin), mercurial diuretics, and increased amounts of digitalis. Over the next several hours he improved rapidly. Since that time he has been maintained on low sodium diet, mercurial diuretics as required, digoxin 0.5 mg daily, expectorants, and pneumodilators.

#### DISCUSSION

The explosive onset of this complication had to be explained by a pathophysiologic process capable of producing an abrupt alteration in ventilatory and/or cardiocirculatory function. The diagnoses considered were (1) acute cardiac arrhythmia, (2) acute myocardial infarction, (3) acute massive pulmonary embolism, or (4) acute alterations in respiratory pressure dynamics adversely affecting ventilation and circulation. Cardiac arrhythmia and myocardial infarction were ruled out by appropriate clinical observations and electrocardiograms. The diagnosis of massive pulmonary embolism was not too satisfactory because



of the absence of many major criteria (1) complete absence of any type chest pain, (2) no acute electrocardiographic changes, (3) no roentgenographic changes compatible with pulmonary infarction or acute pneumonitis, (4) absence of hemoptysis (5) absence of a febrile episode, (6) absence of pleural effusion (7) absence of overt phlebitis (8) absence of jaundice, and (9) absence of shock or collapse

Previous studies have proved that pulmonary embolism may occur without infarction,<sup>1-4</sup> but I believe that an embolus of almost any size at that time would have produced infarction. The patient's long standing obstructive emphysema, cor pulmonale, and hypertensive cardiovascular disease, provided abnormal pulmonary circulation and congestion, which are ideal prerequisites for infarction following embolism. The work of Chapman and associates<sup>1</sup> supports this point. In addition there are theoretical considerations relative to circulatory dynamics under IPPB which argue against the assumption proposed by some that this form of mechanical respiration by increasing velocity of circulation, would stimulate release of embolic showers from already established venous thrombi factories. The fact that clinical and laboratory findings in pulmonary embolism may be extremely varied or nonspecific is appreciated by the author through personal experience and a review of pertinent literature.<sup>1-4</sup> However, when a diagnosis lacks the support of many major criteria as listed above, a curiosity persists about other possibilities.

problem gradually produced, in logical sequence, an association of ideas and facts heretofore scattered and unrelated

Once the mechanisms were organized into a logical sequence of events, the end result was analyzed in terms of three variables that were present simultaneously so as to provide vector forces acting in additive fashion to give an explosive resultant. The three variables believed to be responsible for the patient's complication on IPPB are

- 1 The presence of severe obstructive pulmonary emphysema
- 2 The use of positive inspiratory pressure alone, at a high level (18 cm H<sub>2</sub>O), allowing a passive expiratory phase
- 3 The presence of marked cardiorespiratory abnormality manifested by cor pulmonale and hypertensive cardiovascular disease requiring appropriate therapy

#### SEVERE OBSTRUCTIVE PULMONARY EMPHYSEMA

In normal breathing, the respiratory muscles change the shape of the thorax. As the thorax is actively expanded, an increasingly negative interpleural pressure is produced. An associated reduction of pressure in the alveolar space occurs, producing a pressure gradient (transpulmonary pressure) in the tracheobronchial tree. In the presence of unobstructed air channels, air flow proceeds almost to completion during the inspiratory phase of the cycle.<sup>17,18</sup> This allows air flow into the lungs until alveolar pressure approaches atmosphere pressure, or peak mask pressure in IPPB. Because the alveolar ventilation volume will parallel pressure change, the approximation of mask and alveolar pressure will assure that the alveoli do not change shape more than volume. Expiration then proceeds to completion, the exhaled volume equals the inhaled volume, and respiratory pressure dynamics remain normal.

In the presence of airway obstruction, resistance to air flow prevents the alveolar spaces from filling to mask pressure,<sup>17,18</sup> and the normal sequence of events is altered by the slowing of air flow. The respiratory muscles effect a change in the shape of the thorax, thereby producing an increasingly negative interpleural pressure. The negative interpleural pressure in turn reduces the pressure in the alveoli. This latter situation causes a change in shape of the alveoli that is in the nature of a ballooning or distention. Because the resistance to air flow prevents the alveolar pressure from  
10  
pressure, the volume ventilating  
change in shape. With the stimulus  
sufficiently inflating the airway, volume

as was the case in this patient. This greatly aggravates the sequences outlined above, whereby an increasingly negative interpleural pressure and alveolar distention are produced.

Because the emphysematous patient is further handicapped by altered elastic properties of the lung and thorax, a vicious cycle of disproportion between alveolar distension and alveolar emptying is established. The consequences of this are as follows:

1 Expiration does not proceed to completion, the volume of air exhaled is not equal to the volume inhaled, and air trapping results.

2 Inspiration starts from a progressively higher point on the lung volume scale (hyperinflation) with each respiration.

3 A process of increasing functional residual volume takes place resulting in further impaired alveolar ventilation and hypoxia. As a consequence of the latter, increased capillary permeability ensues.

4 In addition, an increasingly negative interpleural pressure occurs, providing a "suction like" action on the pulmonary capillaries. This results in increased capillary permeability conducive to edema formation.

Now, to account for the explosive nature of this complication one must understand how the above outlined sequence of events was intensely aggravated by voluntary hyperventilation. High level positive pressure inflating of the airway, in the presence of significant bronchiolar obstruction, can provide a stimulus invoking a stress response (hyperventilation) similar to that noted in emphysematous patients performing a maximum breathing capacity. Not infrequently we have to caution and instruct patients about overbreathing during IPPB. In patients with obstructive emphysema, a gross change in thoracic configuration with fixation at a high inspiratory level has been noted. This adverse process of overdistention will continue until either the obstruction is relieved or sufficient elastic recoil presents in the overstretched lungs to expel in the time available an amount equal to the inspired volume.

The importance of a prolonged expiratory phase in patients with emphysema as it relates to the production of positive pressure against the pulmonary capillary, has been stressed by Barach and associates.<sup>4</sup> The prolonged expiration of the patient with bronchospasm results in an increased positive pressure between the site of bronchial constriction and alveolar capillary. However, an acutely elevated negative pressure is introduced within the chest; there is an abrupt termination of

expiratory effort and a consequent loss of the backward pressure on the pulmonary capillaries. As this occurs, the pulmonary capillaries become immediately more permeable. These authors also reviewed the dynamics involved in the production of pulmonary edema following induced tracheal stenosis. Their experiment illustrates how increases in the negative intrapleural pressure, by exerting a suction action on the pulmonary capillaries, increases pulmonary capillary permeability, congestion, and edema formation. This latter condition affects the relationships between the forces of hydrostatic pressure, osmotic pressure, and tissue turgor which operate to maintain the homeostasis of capillary permeability.

Paine and co workers<sup>20</sup> have demonstrated that abnormal fluid exchange in the lung tissue may result from disturbances of hydrostatic and osmotic pressure relationships as described by Starling;<sup>21</sup> they conclude that Starling's principles apply to the pulmonary as well as to the systemic circulations, and must be considered in all future studies relating to the pathogenesis of pulmonary edema.

In applying this basic information to the problem, a sequence of mechanisms was established which explained the occurrence of edema. Let me re-emphasize that this adverse effect of creating a high negative intrathoracic pressure while inflating the airway under positive pressure relates specifically to the presence of an obstructed air flow. In the presence of an unobstructed airway, and normal forces of elasticity and compliance of the lung and thorax, this complication would not be expected. Let us now consider the second variable which added to the dilemma as an additive vector force in the production of the resultant.

#### HIGH LEVEL POSITIVE INSPIRATORY PRESSURE ALLOWING A PASSIVE EXPIRATORY PHASE

In speaking of mechanical respiration, the type used must be specified. In particular, it is not enough to speak only of "positive pressure" treatment of pulmonary edema. The type used may be of paramount importance to result and ventilatory and cardio-circulatory dynamics in the individual patient. The question as to which is the best mechanical method of artificial respiration is still unsettled. Much of the confusion has resulted from the practice of evaluating methods and machines on persons in a normal physiologic state rather than on patients in circulatory and/or respiratory failure. A basic classification of mechanical respiration includes three types<sup>22,23</sup>

1 Intermittent positive pressure. Administered as positive, inspiratory pressure, allowing expiration to occur passively or

to be carried out against positive pressure. Through acquired use, however, IPPB has become identified with the singular use of positive inspiratory pressure.

2 Alternating positive negative pressure in cyclic fashion during inspiration and expiration respectively

3 Continuous positive pressure throughout both phases of the respiratory cycle

In this patient a high level of pressure (18 cm H<sub>2</sub>O) was used. Expiration was allowed to occur passively. In the presence of the severe bronchospasm present at the time, we may assume that the adverse effect of increasing negative intrathoracic pressure resulted. This appeared to be manifested clinically in the patient's thoracic position of advanced inspiration, indicating air trapping. If a negative or positive pressure expiratory phase had been provided, this complication might have been prevented.

It is now readily apparent that the first two variables are related. The one was important only through the simultaneous presence of the other.

#### IPPB IN THE PRESENCE OF CARDIOCIRCULATORY AND/OR RESPIRATORY ABNORMALITY

Numerous studies have been conducted evaluating the use of positive intermittent pressure. In normal persons no significant adverse physiologic changes in cardiopulmonary dynamics have been recorded. This has been documented using all available varieties of machines and pressure alterations.<sup>14</sup> The production of adverse physiologic effects with positive pressure inflation of airways was regularly noted in patients suffering from respiratory and/or circulatory failure. The results in this latter group were in distinct contrast to those in normal persons. The following adverse effects, especially when pressure is in excess of 8 cm H<sub>2</sub>O was applied, were recorded:

1 A fall in systemic blood pressure

2 A decrease in cardiac output. This reaches levels of 41.9 per cent in some severely disabled patients.

3 Increased systemic venous pressure. This reached levels of 70 per cent in patients in failure.

4 Prolongation of circulation time

5 Reduction in blood volume

6 Elevation of cerebrospinal fluid pressure

Studies by Maloney and co-workers<sup>14</sup> suggested a good correlation between the circulatory effects and the mean mask pressure.

They demonstrated that these adverse effects were regularly eliminated by machines employing a negative phase during expiration. Introducing a negative expiratory phase avoided the circulatory depression, improved systemic blood flow, and permitted patients to maintain blood pressure and cardiac output at normal levels.

Our patient was unquestionably in very poor respiratory and cardiocirculatory status. This was well established in his protracted history of pulmonary emphysema, cor pulmonale, and hypertensive cardiovascular disease. It may have been that progressive deterioration of his cardiocirculatory status was the most important variable of those discussed, even though by itself (without high level IPPB) it could not have produced the explosive emergency which occurred.

By integrating these facts we can understand how the simultaneous presence of certain mechanisms, acting in the manner of additive vector forces, produced an alteration in function. The resultant explosive formation of pulmonary edema represented a summation of many forces. This took place even though by standard classification the treatment method was indicated for the disease state. The lessons or recommendations that might be drawn from this experience are:

- 1 Mechanical respiration is an excellent therapeutic tool but demands an understanding of methods, machines, and physiologic effects in treating respiratory and/or cardiocirculatory problems.

- 2 It is especially important to find out whether the air channels are obstructed or unobstructed, and whether the cardiocirculatory status is normal or to some degree abnormal.

- 3 Positive pressure breathing assistance in the treatment of pulmonary edema must be individualized as to type and pressure level.

- 4 Alteration in function is effected through the additive (cumulative) action of multiple vector forces producing a given resultant.

#### SUMMARY

A case of acute pulmonary edema occurring during positive pressure inflation of the air channels is presented. The attending ward physicians thought that this resulted from a massive pulmonary embolism. In the absence of many major diagnostic criteria, a different explanation was sought. Analysis based upon physiologic principles that have been known for years seems to support the contention that this complication was the resultant of multiple vector forces acting simultaneously in an additive manner. In the final analysis the condition must be recognized as a complication of intermittent positive pressure breathing.

## REFERENCES

- 1 Chapman D W, Gagle L J and Wheeler P W Experimental pulmonary infarction abnormal pulmonary circulation as prerequisite for pulmonary infarction following embolus *Arch Int Med* 83 158-163 Feb 1949
- 2 Woessner M E, Gardner G A. and Stinson, W L. Pulmonary embolism does not necessarily mean pulmonary infarction case report *Am. J Roentgenol.* 69 380-384 Mar 1953
- 3 Hampton A. O. and Castleman B. Correlation of postmortem chest teleroentgenograms with autopsy findings, with special reference to pulmonary embolism and infarction *Am. J Roentgenol.* 43 305-326, Mar 1940
- 4 Friedberg C. K. *Diseases of the Heart* W B Saunders Co Philadelphia, Pa. 1956. pp 959-966
- 5 Goyette E. M. Diagnosis and management of pulmonary embolism and infarction *Dis. Chest* 25 15-24 Jan 1954
- 6 Barach A. L. Martin, J. and Eckman M. Positive pressure respiration and its application to treatment of acute pulmonary edema *Ann. Int. Med.* 12 34-795 Dec 1938
- 7 Whittenberger J. L. and Maloney J. V. Jr. Physiologic factors in use of body respirator for impaired respiratory function *Dis. Chest* 22 141-151 Aug 1952.
- 8 Barach, A. L. Fenn W. O. Ferris E. B. and Schmidt C. F. Physiology of pressure breathing: brief review of its present status. *J. A. Nat. Med.* 18 73-87 Feb 1947
- 9 Barach A. L. Recent advances in inhalation therapy in treatment of cardiac and respiratory disease: principles and methods. *New York State J. Med.* 37 1095-1110 June 15 1937
- 10 Christie R. V. and Meekins J. C. Intrapleural pressure in congestive heart failure and its clinical significance. *J. Clin. Invest.* 13 323-345 Mar 1934
- 11 Beck G. J. Sennor H. E. Barach A. L. and Gates D. Effects of pressure breathing on venous pressure: comparative study of positive pressure applied to upper respiratory passage way and negative pressure to body of normal individuals. *Am. J. M. Sc.* 224 169-174 Aug 1952
- 12 Daynes H. Mechanics of airflow in health and in emphysema. *J. Clin. Invest.* 30 1175-1190 Nov 1951
- 13 Motley H. L. and Tomahelsh J. F. Treatment of chronic pulmonary disease with intermittent positive pressure breathing: evaluation by objective physiological measurements. *A. M. A. Arch. Indust. Hyg.* 5 1-9 Jan 1952
- 14 Maloney J. V. Elam J. O. Handford S. W. Balla, G. A. Eastwood, D. W. Brown F. S. and TenPas R. H. Importance of negative pressure phase in mechanical respirators. *J. A. M. A.* 152-212-216 May 16 1953
- 15 Smart R. H. Davidson C. K. and Pearson G. W. Intermittent positive pressure breathing in emphysema of chronic lung disease. *J. A. M. A.* 150 1385-1390 Dec 6 1952.
- 16 Courmand A. Motley H. L. Werko L. and Richards D. W. Jr. Physiological studies of effects of intermittent positive pressure breathing on cardiac output in man. *Am. J. Physiol.* 152-162-174 Jan 1948.
- 17 West J. R. Baldwin E. d. F. Courmand, A. and Richards D. W. Jr. Pathologic aspects of chronic pulmonary emphysema. *Am. J. Med.* 10 481-496 Apr 1951
- 18 Fry D. L. Ebert R. V. St. ad, W. W. and Brown C. C. Mechanics of pulmonary ventilation in normal subjects and in patients with emphysema. *Am. J. Med.* 16 80-97 Jan 1954
- 19 Mead J. Lindgren I. and Gossler E. A. Mechanical properties of lung in emphysema. *J. Clin. Invest.* 34 1005-1016 July 1955
- 20 Paine R. Butcher H. R. Howard F. A. and Smith J. R. Observations on mechanisms of edema formation in lungs. *J. Lab. & Clin. Med.* 34 1544-1553 Nov 1949
- 21 Starling E. H. Physiological factors involved in causation of dropsy. *Lancet* 1 1267-1270 May 9 1896

# Total Pancreatectomy for Chronic Relapsing Pancreatitis and Calcinosiis of the Pancreas

O'NEILL BARRETT Jr, *Captain MC USA*  
WARNER F BOWERS *Colonel MC USA*

**T**OTAL pancreatectomy has been shown to be a practical procedure in the treatment of certain types of pancreatic disorders, including some cases of carcinoma of the pancreas, islet-cell adenoma, and chronic relapsing pancreatitis with or without calcification.<sup>1</sup> Although the technical difficulties of the procedure have been satisfactorily overcome, physiologic problems have been produced, some of which are incompletely understood. Some 40 cases of total pancreatectomy have been recorded in the literature and from these has been gleaned valuable information concerning the metabolic changes which are produced together with their method of management. However, as Waugh and associates<sup>2</sup> pointed out, many patients, young and old, must be observed and studied before final conclusions can be reached concerning the character of diabetic and other changes in these patients. We wish to report another case of successful total pancreatectomy and to discuss some of the metabolic changes noted during a 12 month follow-up.

## CASE REPORT

A 33 year old Negro was first admitted to this hospital on 10 February 1951 for orthopedic treatment of wounds of the right wrist received in Korea. During the period of treatment he developed episodes of "acute gastritis" associated with nausea, vomiting, and epigastric pain. These attacks were mild in nature, responded to conservative therapy and were usually associated with ingestion of alcohol. Serum amylase, urinalyses and two gastro intestinal roentgenographic studies were reported as normal. Following discharge from service, the patient had repeated similar episodes which did not require hospitalization. In February 1954 the patient was seen in a Veterans Administration outpatient clinic where glycosuria was found and a diagnosis of diabetes made. The condition was mild and easily controlled by diet alone.

On 8 April 1954 the patient was rehospitalized at this hospital because of right upper quadrant and epigastric pain with radiation to

---

From Brooke Army Hospital, Fort Sam Houston, Tex. Col. Bowers is now assigned to Tripler Army Hospital, Territory of Hawaii.



the back of two days duration. There was no associated nausea, vomiting, hematemesis or icterus. He also gave a history of a 30-pound weight loss and increased frequency of micturition during the 6 months prior to admission. His attacks of pain had become so severe, disabling, and of such frequency that he was no longer able to hold a job. Past history revealed a moderate intake of alcohol for several years. There was no family history of diabetes or other significant illness.

Physical examination showed a thin man in acute distress. His height was 5 feet 7 inches, weight 118 pounds, temperature 98.6, pulse rate 74 per minute, and blood pressure 118/74 mm Hg. Significant findings were limited to the abdomen. There was no distention or rigidity, but definite tenderness to palpation in the epigastrium and right upper quadrant with voluntary guarding was noted. No organs or masses were felt, and peristalsis was normal. The remainder of examination revealed normal findings except for healed scars of the right wrist and hip. Routine laboratory studies and urine sugar were normal. Serum amylase determinations on three occasions over a six day period were all within normal range. A gastro-intestinal roentgenographic study showed no intrinsic disease but revealed heavy calcification in the region of the pancreas (fig. 1). The gallbladder was barely visible on a cholecystogram.

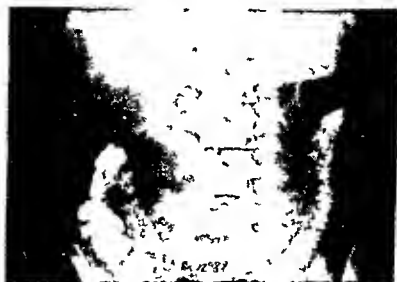


Figure 1 Heavy diffuse calcification of the pancreas throughout its entire extent

On 22 April the patient was taken to surgery where the pancreas was exposed following division of the gastrocolic omentum. The organ was found to be hard, nodular, and pale with marked edema of the surrounding tissues. The spleen was removed because a severe and extensive fibrous reaction made it technically impossible to identify

and spare the splenic vein. When the lateral and diaphragmatic attachments of the spleen had been divided together with the vessels to the greater curvature of the stomach, it was possible to move the spleen anteriorly and thus carry out the posterior dissection more simply. The splenic vein was ligated at its junction with the mesenteric vein to form the portal vein and the splenic artery was ligated at the celiac axis. The pancreatic ducts were exposed and ligated. Dissection of the pancreas from the portal vein was extremely difficult because of dense adherence. The common duct could not be located even when the lateral attachments of the duodenum had been divided nor could it be identified even when the duodenum had been opened and a rigid probe had been passed up the duct through the papilla. Consequently, the pancreas was "carved" off of the medial aspect of the duodenum leaving a rim of fibrous tissue around the probe when it eventually could be palpated. The blood supply to the duodenum was not disturbed so that no interruption of the gastro intestinal tract was necessary. The entire pancreas was then mobilized and beneath the head a small pseudocyst was found. Pancreas, cyst and spleen were removed *en bloc* (figs. 2-4). A T tube was placed in the common duct and the abdomen was closed bringing the T tube out through a lateral stab wound for external drainage as a precautionary pressure vent.

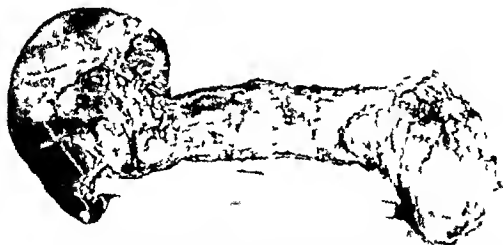


Figure 2 The tail of the pancreas is densely fused to the hilum of the spleen, which showed passive hyperemia in microscopic section. The normal appearance of pancreas is lost there being no apparent lobulation and the small pseudocyst is seen in the region of the uncinate process.

The postoperative course was entirely smooth with neither biliary, duodenal nor pancreatic leak. The patient had one episode of hypoglycemia on the first day and was maintained on intravenous fluids and regular insulin, the latter not exceeding 25 units per day. By the third postoperative day the patient was given a 2,000-calorie diet and varying amounts of regular insulin, averaging 24 to 36 units daily. On the tenth postoperative day the T tube was clamped for several hours and the patient did not experience any pain or discomfort. Therefore the tube was

left clamped and when a cholangiogram two days later showed normal sphincter function and common duct emptying the T tube was removed without incident or sequelae. On 13 May the patient was placed on



Figure 3. Roentgen examination of the excised specimen demonstrates the diffuse calcification which follows the course of the duct.

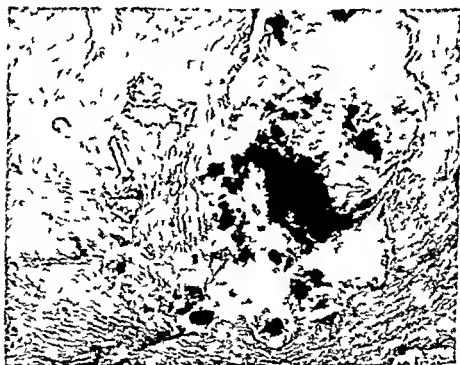


Figure 4. Photomicrograph of the pancreas showing diffuse heavy fibrosis with loss of definitive pancreatic tissue. An area of calcification is clearly shown.

30 units of protamine zinc insulin which was changed to neutral protamine Hagedorn (NPH) insulin on 7 June good control being maintained throughout. The remainder of the hospital stay was uneventful except for some right upper quadrant pain following meals

The patient was discharged from the hospital on 25 units of NPH insulin a 2,000-calorie low fat diet, and no pancreatin

The patient was followed in the diabetic and gastroenterology clinics. He did well but added fats to the diet and developed crampy abdominal pain, abdominal distention, and began passing two to four bulky, foul smelling stools per day. He was placed on 3 grams of pancreatin and noted some improvement although he continued to have abdominal distention, especially in the mornings. Although fairly good control of the diabetes was maintained the insulin requirement gradually and progressively increased (fig. 5)

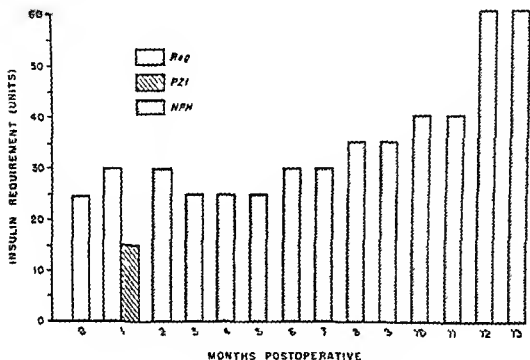


Figure 5 Patient's postoperative insulin requirement

On 7 April 1955 the patient felt ill, and had a 4 plus urine sugar and a blood glucose of 626 mg per 100 ml. He was admitted to the gastroenterology service for further evaluation. Physical examination showed no marked changes from the previous admission except for the presence of marked abdominal distention. The diabetes was brought under control by gradually increasing the NPH insulin to 60 units. Pancreatin dosage was increased to 6 grams per day. Laboratory studies obtained during the hospitalization were as follows: admission hemogram normal; urinalysis showed 4 plus sugar, blood glucose 342 mg per 100 ml; blood urea nitrogen, 23 mg per 100 ml; basal metabolic rate on three occasions, minus 2 minus 13 plus 15. Liver function studies showed sulfobromophthalein sodium retention, 2 per cent bilirubin 1.2 mg per 100 ml; prothrombin time 14 seconds (normal 15 seconds); alkaline phosphatase 10.5 units; cephalin-cholesterol flocculation 4 plus in 24 hours and 4 plus in 48 hours.

and thymol turbidity 10.4 units. Cephalin-cholesterol flocculation and thymol turbidity determinations were done as part of the routine liver studies (although strictly speaking their inclusion among liver function tests may be questioned) and because they showed abnormal levels liver biopsy was performed. The specimen showed only minimal histologic change with radiating cords of typical polygonal cells with well-defined borders and oval to round nuclei with uniform staining quality but with some variation in size and with vacuolation of many nuclei; the portal triads showed a few infiltrating lymphocytes and an occasional polymorphonuclear cell. There was no evidence of fatty infiltration (fig. 6). We were unable to explain the abnormal values of the cephalin flocculation and thymol turbidity. Roentgenograms of the skull were normal.

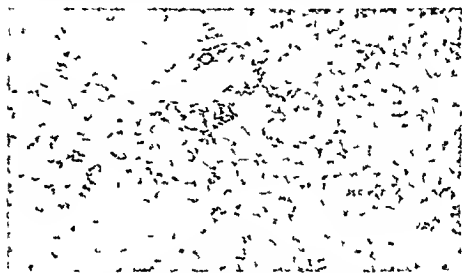


Figure 6. Photomicrograph of liver biopsy specimen.

During hospitalization the patient showed rapid improvement; the diabetes was well controlled and the abdominal distention almost completely disappeared. After discharge the patient was again followed in the clinic and has done well to date. Caloric intake as far as possible was maintained between 2,200 and 2,400 calories. There was a gradual but progressive gain in weight from an immediate postoperative level of 118 pounds to 127 pounds 14 months later.

#### DISCUSSION

Severe organic tissue change in the pancreas indicates that medical management alone will not give the patient sufficient relief. It was thought that the physiologic damage in the pancreas of this patient (as evidenced by development of diabetes) and the structural damage (as demonstrated roentgenographically by the heavy diffuse calcification) required operative intervention. Operative treatment is limited to attempts at promoting more

July 1957)

# CASE REPORTS—PANCREATECTOMY

1043

effective drainage, ablation of pain, or removal of degenerated tissue. Promotion of drainage by sphincterotomy or anastomosis of the tail of the pancreas to the bowel to allow retrograde drainage did not seem indicated, for although there was diffuse calcification along the duct system, there were no stool changes indicative of a lack of external pancreatic secretion. Ablation of pain by splanchicectomy is not always successful and has the disadvantage of failing to attack the site of tissue change. We prefer a direct attack rather than simply roading retained abnormal tissue less painful. For these reasons excision was decided upon and because the diabetes and diffuse calcification both indicated extensive damage, total pancreatectomy was thought to be the only chance for an acceptable end result. Formerly, it was believed that total pancreatectomy was mandatory. This meant that the Whipple procedure with its disruption of continuity of the gastro intestinal and biliary tracts was necessary. We now know that total pancreatectomy can be accomplished without sacrifice of the duodenum and without necessarily entering the common duct. This permits total removal of diseased tissue by means of a much less radical procedure. Finally, we do not accept the philosophy that all lesser procedures should be tried and proved as failures before the final radical procedure is justified. This would mean subjecting the patient to at least three major operations, which seems too much to require.

In most cases, the insulin requirement following total pancreatectomy has been noted to be relatively low and insulin sensitivity increased.<sup>2-4</sup> Because of this, it has been suggested that in the immediate postoperative period, control of ketosis, rather than the blood sugar level, should be the primary aim. When diabetes exists prior to the time of surgical intervention, the severity of the disease shows more variation. Dixon and associates<sup>5</sup> reported a case in which diabetes, present for four years prior to surgical intervention, remained at about the same severity postoperatively. Pincus and Rutman<sup>6</sup> noted that some patients who had been diabetic previously actually required smaller amounts of insulin after operation. Our patient has shown a progressive increase in the amount of insulin required for satisfactory control.

The nature of the increased insulin sensitivity has been discussed by many authors and several mechanisms have been suggested, including poor nutritional status,<sup>1</sup> disturbances of digestion and absorption,<sup>7</sup> and elimination of the activity of a pancreatic insulin antagonist following operation. It has since been shown that this latter substance is glucagon and is probably derived from the alpha cells of the pancreas. Its function is to raise blood glucose levels by producing glucose from hepatic glycogen.<sup>8</sup> That this substance is actually an adjunct,

rather than an insulin antagonist, was substantiated by Van Itallie, Morgan, and Dottie<sup>6</sup> who showed that peripheral utilization of glucose was enhanced by glucagon. That the absence of such a hyperglycemic agent might be responsible, in part, for the milder diabetes would seem reasonable.

All patients who have had a total pancreatectomy show some impairment of digestion and absorption of fats and protein.<sup>7</sup> Our study did not include stool analysis for fats, but clinically the patient manifested fat intolerance as shown by abdominal distention, discomfort after a fatty meal, and several bulky stools per day. These symptoms were well controlled by the administration of 6 grams of pancreatin per day, which is in keeping with the suggestion by Fallis and Szilagyi<sup>2</sup> that from 6 to 8 grams is usually sufficient.

In experimental work with dogs, Dragstedt<sup>8</sup> demonstrated the development of fatty livers following total pancreatectomy. This could be prevented by the administration of raw pancreas. He believed that this effect was not due to pancreatic enzymes, lecithin, or choline, but to a specific substance called lipocaine, thought to be an internal secretion of the pancreas. Beneficial effects of pancreatin were attributed to presence of lipocaine as well as pancreatic enzymes in this substance. Later studies<sup>9</sup> showed that a lipotropic pancreatic substance either is not required for lipid metabolism in the human being or, if it is required, is supplied in sufficient amounts in the average diet. Honjo and Araki<sup>1</sup> reported that the absorption of fats following total pancreatectomy was better in humans than that noted in dogs and concluded that man retains a better capacity for absorption after surgery than does the dog.

#### SUMMARY

Severe organic tissue change in the pancreas of patients with chronic relapsing pancreatitis indicates that medical management alone will not be adequate treatment. Physiologic damage, as evidenced by diabetes or fat intolerance, and structural damage as evidenced by calcification of the pancreas, require operative treatment. Total pancreatectomy, which can now be accomplished without sacrifice of the duodenum, permits total removal of the diseased tissue. We do not accept the philosophy that all lesser procedures should be tried and proved as failures before total pancreatectomy is justified.

In the case reported, total pancreatectomy for chronic relapsing pancreatitis and calcification of the pancreas was performed. Postoperatively the patient's diabetes showed a progressive decrease in insulin sensitivity, in contrast to the increased sensitivity usually noted. Although no chemical determinations of fat metabolism were made, postoperatively the fat tolerance was greatly improved clinically by the daily administration of

6 grams of pancreatin Liver function studies showed slight aberration after operation A needle biopsy of the liver was performed to rule out fatty infiltration, which has been observed in dogs and suggested as occurring in man No significant histologic abnormalities were noted To our knowledge, this is the first reported histologic study of the liver following total pancreatectomy

## REFERENCES

- 1 Waugh J M Dixon C F Clagett O T Bollman J L and Sprague R S Total pancreatectomy symposium presenting 4 cases and report on metabolic observations *Proc Staff Meet Mayo Clin* 21 25 46 Jan 23 1946.
- 2 Folliis L S and Szilagyi D E Observations on some metabolic changes after total pancreateoduodenectomy *Ann Surg* 128 639-667 Oct 1948.
- 3 Gastoo E A Total pancreatectomy *New England J Med* 238 345-354 Mar 1948.
- 4 Goldoer M G and Clark D E Insulin requirements of man after total pancreatectomy *J Clin Endocrinol* 4 194 197 May 1944
- 5 Dixon C F Comfort M W Lichtman A L and Benson R E Total pancreatectomy for carcinoma of pancreas in diabetic person metabolic studies *Arch Surg* 52 619-639 June 1946.
- 6 Pincus I J and Rutman J Z Glucagon hyperglycemic agent in pancreatic extracts possible factor in certain types of diabetes *A M A Arch Int Med* 92 666-677 Nov 1953
- 7 Honjo I and Araki C Total pancreatectomy *J Internat Coll Surgeons* 19 692-703 June 1953
- 8 Van Itallie T B Morgan M C and Dottic L B Effect of glucagon on peripheral utilization of glucose in man *J Clin Endocrinol* 15 28-35 Jan 1955
- 9 Dragstedt L R Some physiologic problems in surgery of pancreas *Ann Surg* 118 576-593 Oct 1943



# Transverse Aberrant Testicular Maldescent

JOSEPH E DAVIS *Captain MC USA*

**T**ESTICULAR anomalies of position have been classified as undescended and descended.<sup>1</sup> An undescended testicle may be obstructed in its normal anatomic course by mechanical or hormonal factors, in which case it is considered cryptorchid. If it lodges outside of its normal pathway it is ectopic. Anomalies of the descended testicle are inversion in which the testicle is upside down and retroversion in which the posterior surface of the testicle is anterior. Both of the latter conditions are very rare.

The ectopic testicle may be (a) interstitial or inguinal in which the testicle lies anterior to the aponeurosis of the external oblique muscle (b) femoral (crural) in which the testicle lies in Scarpa's triangle (c) pubopenile, (d) perineal, or (e) transverse aberrant. In the last condition both testes descend through the same inguinal canal to the same scrotal sac. Fourteen cases of this anomaly have been reported in the literature. In 1910 Corner<sup>2</sup> observed a 14 year old boy whose left testicle was found within a congenital right hernia. In 1916 Hertzler<sup>3</sup> found both testes and an infantile uterus in the same scrotal cavity of a pseudohermaphrodite. In a case recently reported by Lowsley and Hirwin<sup>4</sup> a 30 year old man had absence of the left testicle from the scrotum, bilateral hernias and perineal hypospadias. During left hernioplasty no testicle was found. During right hernioplasty a small aberrant testicle without an epididymis was found suspended by means of a small vas from the middle of the inguinal portion of the normal right vas. The aberrant testicle contained a malignant dysgerminoma. Lowsley and Forras<sup>5</sup> stated that this anomaly is frequently associated with congenital inguinal hernia, less often hypospadias and presence of a small infantile uterus within the scrotal sac.

## CASE REPORT

A 26-year old man was admitted to this hospital with a chief complaint of swelling and pain in the right groin of one month duration. The patient stated that this began while he was carrying lumber. He had felt something give on the right side of his abdomen near the groin and thereafter noted a bulge into the right scrotum. He

was able to replace this bulge into the abdomen. Pain in the groin was accentuated by coughing and straining. There was no history of gastrointestinal or genitourinary disturbances.

**Post History** The patient stated that he had had no serious illnesses. At age six he fell and injured his left scrotal area. He denied being treated by a physician and he was not hospitalized for this injury. As long as the patient could remember, he had had only one scrotal testicle.

**Family History** The patient was married and had two children. All were in good health and the children had no congenital anomalies. There was no history of anomalous development in the patient's parents.

**Physical Examination** Physical examination revealed a well developed, somewhat obese, man in good health. The ears, nose, and throat were normal. Heart and lungs were normal. The abdomen was moderately protuberant with no palpable masses. Examination of the genitalia revealed a normal penis, normal right scrotal testicle, and a complete right indirect inguinal hernia. The left external inguinal ring was narrow, and a slight impulse was transmitted to the examining finger when the patient coughed. There was no evidence of hernia on this side. A 2 inch, well healed, contracted scar was noted in the left scrotal tissue laterally. There was questionable underdevelopment of the left scrotal tissue. No testicle or cord structures were palpable in the left scrotum.

**Laboratory Findings** The serologic test for syphilis and results of a urinalysis were negative. Hemoglobin was 16 grams per 100 ml. The white blood cell count was 8 000 per  $\mu$ l. A roentgenogram of the chest was normal.

**Course in Hospital** On 31 January 1957, under general anesthesia, exploration of the right inguinal canal was performed. Inspection of the cord structures revealed a congenital indirect hernia, the sac extending around the right testicle. Proximally, the hernial sac was mobilized and dissected away from the cord up to the internal ring. Visualization of the opened sac at this point revealed a sliding component. Mobilization of this component revealed a testicle and associated cord structures, including epididymis and vas deferens. This testicle was one third the size of the scrotal testicle, soft, and separated from its epididymis. Palpation of the mesorchium and the cord structures of this atrophic testicle suggested that they emanated from the left extraperitoneal space. There was no evidence of adhesions or scar tissue surrounding the testicle or cord structures, which might have suggested that this testicle had luxated from the left following the known episode of trauma. The cord of this aberrant testicle could be mobilized easily through the right internal ring. It could be brought down the right inguinal canal easily. Because of their atrophic appearance the aberrant testicle and cord structures were resected. The internal ring was then closed following high

ligation and resection of the bermal sac at its oeck A Bassini type hernioplasty was performed The postoperative course was uneventful A postoperative intravenous pyelogram revealed no other evidence of urinary tract anomalies Microscopic study of the aberrant testicle revealed it to be atrophic there was no evidence of neoplasia in this testicle

### DISCUSSION

In fetal development the gonads form just below the diaphragm A more rapid elongation of the trunk cephalad, in contrast to the slower growing gonad, produces a relative shift of the gonad to a more caudal position At 10 weeks the caudal end of the gonad lies at the boundary of the abdomen and pelvis close to the groin At 12 weeks a sac like protrusion of peritoneum, the vaginal process, evaginates through the ventral abdominal wall producing a short inguinal canal, and at the 7th month passes over the pubis into the scrotum In doing this muscular and fascial layers of the abdominal wall are also carried down and added to what becomes a scrotal sac After the 6th month the testis normally descends along this same path The testis follows the gubernaculum along the inguinal canal The ductus deferens, spermatic vessels, and nerves are carried into the scrotum along with the testis and epididymis

The cause of testicular descent is still unknown The role of the gubernaculum is disputed It has been thought that at the seventh month the gubernaculum stopped in its growth and shortened, thereby drawing the testicle into the scrotum Others say the gubernaculum is too loosely attached to the testis to do this In experimental animals even though the gubernaculum was severed normal descent of the testicle occurred in the majority of cases Evidence suggests that hormonal factors are probably the chief cause of descent

The cause of abnormal descent also is unknown, but the following anatomic factors either singly or in combination may predispose to testicular maldescent (1) an unusually long testicular mesentery which allows the gland undue intra abdominal freedom and renders engagement in the internal ring less likely (2) mesorchial peritoneal adhesions, (3) abnormal persistence of the plica vascularis which may anchor the testis high (4) short spermatic vessels or vas deferens (5) testicular fusion (6) absent, unusually long, or inactive gubernaculum (7) maldevelopment of the inguinal canal—either relative or absolute atresia (8) cremasteric hyperactivity interfering with descent (9) scrotal maldevelopment or absence of a testicular cavity

The role of the gubernaculum may be only to guide or make a pathway for the descent of the testis In rats, when the cranial

nerve was severed prior to eight days of age, failure of testicular descent occurred isolaterally.

In the case reported, the testicle was completely separated from the epididymis. This is a frequent anomaly in the presence of ectopia testis, and is due to failure of urogenital union at the sixth week of development. Congenital hernia associated with ectopia is also a frequent occurrence. It is theorized that in this patient, descent to the opposite internal ring was caused either by aberrant gubernacular attachment and/or a defective left internal ring. It is interesting to note that in dissection of the three month embryo, the testes are in close approximation in their descent, being no more than several millimeters apart.

Operation is the treatment of choice in ectopic testes in order to either replace the testis in the scrotum if possible, or to remove the testis if it is atrophic. Studies have demonstrated a fairly high incidence of neoplasia in ectopic testes. The danger of torsion is also present in a freely movable intra abdominal testicle. Marked separation of the testis and epididymis is also a predisposing factor for torsion of the spermatic cord. Hormone therapy is valueless. The optimum period of time for orchiopexy is up to age eight.

Following demonstration of testicular anomalies it is important to investigate the possibility of other anomalies of the genitourinary and other systems. In our patient, no other anomalies were apparent.

#### SUMMARY

Transverse aberrant testicular maldescent is a form of testicular ectopia. Fourteen cases of this condition in which both testes descended through the same inguinal canal to the same scrotal sac, have been reported in the literature. This anomaly is frequently associated with congenital inguinal hernia and less often with hypospadias.

In the case reported, transverse aberrant testicular maldescent was associated with a congenital hernia and separation of the testicle and epididymis. It is postulated that in this patient, maldescent of the left testicle to the opposite internal ring was caused either by aberrant gubernacular attachments and/or a defective left internal ring.

Three factors make operative intervention the treatment of choice for ectopic testes: (1) the high incidence of neoplasia in ectopic testes, (2) the danger of torsion of the spermatic cord in a freely movable intra abdominal testicle, or when there is marked separation of the testis and epididymis, and (3) the ineffectiveness of hormone therapy. The testis may be replaced in the scrotum if possible, or removed if it is atrophic. The optimum period of time for orchiopexy is up to age eight.

It is important to look for other congenital anomalies when this testicular developmental abnormality is discovered

## REFERENCES

- 1 Campbell M Urology W B Saunders Co Philadelphia Pa., 1954 Vol 1 pp 450-470
- 2 Corner E M & Male Diseases in General Practice Oxford University Press London 1910
- 3 Hertzler A E Ectopia testis transversa with infantile uterine Surg Gynec & Obst 23 597 Nov 1916
- 4 Lowale O S and Kurwin T J Clinical Urology 3d edition Williams & Wilkins Co Baltimore Md 1956 Vol 1 pp 180-181 174
- 5 Lowale O S and Porras E Congenital anomalies of testicle J Internat Coll Surgeons 15 332-342 Mar 1951
- 6 Atay L B Developmental Anatomy 6th edition W B Saunders Co Philadelphia Pa 1954 pp 326-337
- 7 Lewis L G Cryptorchidism J Urol 60 345-356 Aug 1942
- 8 Hayner J C Personal communication

## ALDOSTERONISM VS PRIMARY RENAL DISEASE

The distinction between primary renal and primary adrenal potassium loss is a matter of great moment for in Conn's syndrome [aldosteronism] removal of the adrenal tumour may bring about complete cure while in primary potassium losing renal disease potassium supplements are the only useful treatment and complete renal failure is the expected outcome Conn's syndrome is to be suspected when there is no history of a primary renal disease when very large potassium supplements fail to lead to the improvements expected and when renal biopsy shows only the tubular lesions of potassium depletion without evidence of other renal disease. If there are signs of an adrenal tumour and if it is possible to demonstrate excessive amounts of aldosterone in the blood or urine the diagnosis becomes easier but if doubts cannot be resolved exploration of the adrenals may be justified

—EDITORIAL  
in Lancet

p 1199 Dec 8 1956

# Multiple Subcutaneous Granular-Cell Myoblastoma

HAROLD A. ALSOBROOK *Lieutenant Commander MC USN*  
JAMES H. LOCKWOOD *Captain MC USN*

**G**RANULAR CELL myoblastoma is generally considered to be a relatively rare benign tumor, most often occurring as a solitary lesion involving the tongue. The next most common site of occurrence is the subcutaneous tissue,<sup>1</sup> in which there is usually an intimate association of the tumor with the overlying epidermis. This association is characteristically represented by pseudoepitheliomatous hyperplasia,<sup>2</sup> which could be interpreted as squamous cell carcinoma. The tumor usually appears in the third, fourth, or fifth decade. Recently Cnve,<sup>3</sup> Kopf,<sup>4</sup> and Vegas<sup>5</sup> reported three cases of multiple myoblastomas occurring in children whose ages were 4, 6, and 8 years. The sexes are equally affected.

Granular cell myoblastoma was recognized as a clinical and pathologic entity after the original publication by Abrikosoff<sup>6</sup> in 1926, who was of the opinion that striated muscle was chiefly implicated in the histogenesis of this tumor. Since that time there have been others who have, by tedious morphologic and histochemical studies, come to the conclusion that granular cell myoblastoma is of neural origin.<sup>7-10</sup>

Malignant granular cell myoblastoma has been reported<sup>7-10</sup> but its incidence, as the literature indicates, is extremely rare. Malignant granular cell myoblastoma arising in the urinary bladder with subsequent widespread metastases and death was reported by Ravich, Stout, and Ravich.<sup>7</sup> Ross, Miller, and Foote<sup>10</sup> reported three cases of malignant granular cell myoblastoma. They were of the opinion that the reported frequency of occurrence of this tumor in a malignant form has been exaggerated by the inclusion of other types of myosarcomas.

The occurrence of multiple, subcutaneous, benign, granular cell myoblastoma nodules is rare, the incidence being about 2.5 percent in a total of less than 250 cases reported up to the present time.<sup>11-14</sup>

From U S Naval Hospital San Diego Calif Comdr Alsobrook is now assigned to U S Naval Hospital Newport R I and Capt Lockwood is assigned to U S Naval Hospital Philadelphia Pa

the muscle tends to have elongated blunt ended nuclei while the nuclei of the alleged nerve fibers are sharply pointed "

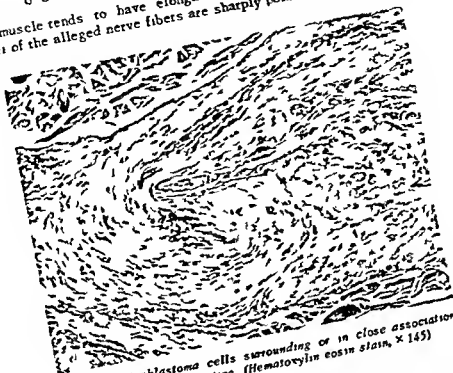


Figure 1 Myoblastoma cells surrounding or in close association with a neural structure (Hematoxylin eosin stain, X 145)



Figure 2 Higher magnification of an area similar to that shown in figure 1. Note the peculiar vacuolated appearing cells containing granules which are in close association with a neural structure (Mallory stain, X 280)

## CASE REPORT

A 23-year old white man was well until the spring of 1952 when he first noted a small, nontender, subcutaneous nodule on the ventral aspect of his right forearm. During the following 15 months he developed multiple 7- to 12 mm moderately firm, subcutaneous nodules on the neck, face, chest, both arms, buttocks, and legs. Some of these tumors seemed to be attached to the overlying skin. The nodules were not painful but there was some tenderness when moderate pressure was applied. He had no systemic complaints. His past history and family history were essentially negative. The general physical examination was normal except for the findings as stated above.

The laboratory work was reported as follows: white blood cell count, 7,200 per  $\mu$ l with a differential count of 48 per cent neutrophils and 52 per cent lymphocytes, red blood cell count, 5,560,000 per  $\mu$ l, hemoglobin, 15.5 grams per 100 ml, hematocrit, 54 ml per 100 ml. The urine was normal. The blood Kahn test was negative. The total serum protein was 7.1 grams per 100 ml, albumin 4.9 and globulin 2.2 grams per 100 ml. A roentgenogram of the chest was reported negative. A complete skeletal survey failed to demonstrate any definite roentgenographic evidence of disease of the bones.

## Pathologist's Report

The histopathologic report from the pathology service of this hospital on an excised specimen was as follows: "The sections show skin with multiple circumscribed nodules in the dermis. The latter are composed of large polyhedral cells with a coarse, pink, granular cytoplasm and small, round hyperchromatic nuclei. The cells are regular in size, shape, and staining reaction. No mitoses or giant nuclei are seen. There is a definite relationship between the nodules and peripheral nerves [figs 1 and 2]. At least one of the nodules shows the presence of nerve fibrils in the center of the nodule. Several of the other nodules show nerve sheath cells along the periphery. There is no evidence of malignancy. Acid fast stains of the tissue are negative. Diagnosis: Granular-cell myoblastoma."

From a second excised specimen, Dr. Harlan L. Papenfuss, of Lincoln, Nebr. (formerly on active duty as a pathologist at this hospital) made a series of specially stained slides for study. In reference to the hematoxylin-eosin type stained sections he stated in part:

"In all of the slides within some of these masses [of granular cells] and near their central point, one notes a small bundle of varying length of rather closely packed narrow, spindle shaped cells all running in a uniform direction [fig 3]. In a few areas these bundles of cells seem to be near the periphery of the nodule as if they are penetrating the mass of cells. It is these bundles that I feel are the nerve bundles of nerve fibers. Note that they differ in character from the smooth muscle of the *arrectores pilorum* muscles. With hematoxylin-eosin type staining the contrast is not too great, yet the *arrectores pilorum* muscles appear to have more cytoplasm and less nuclei. Similarly,



Masson's trichrome and a reticulum stain aided little. However, azocarmine stain revealed that the bundles of fibers under discussion stained bluish rather than red orange as did the arrectores pilorum and were therefore, not muscle. A Weil's stain for myelin sheaths showed a blue-black staining of some of the fibers of these bundles, which was interpreted as evidence of myelin and therefore of neural origin."

This set of slides was presented to Dr. Hamilton Montgomery, Section of Dermatology, the Mayo Clinic, for study and comment. Both he and his associate, Dr. R. A. Winkelmann, were impressed by the evidence of nerve involvement but with reservations. Dr. Winkelmann, who has done considerable study in regard to cutaneous nerve endings, stated that although the close correlation between the granular-cell

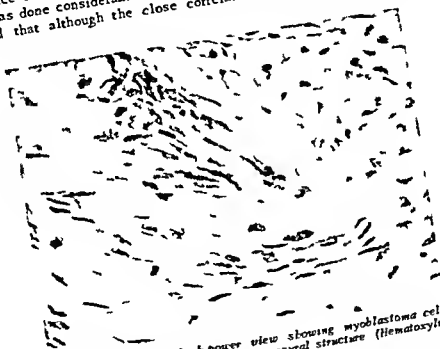


Figure 3 Another high-power view showing myoblastoma cells with what appears to be part of a neural structure (Hematoxylin-eosin stain, X 420)

myoblastoma cell masses and nerves was the strongest evidence he had yet seen of the neural origin of this tumor. Nevertheless, the nerves themselves appeared normal and had the tumor arisen in nerve that structure should have been destroyed early. Dr. Montgomery was of the same opinion as was Dr. J. Kernohan of the Mayo Clinic, who reported that the tumor appeared to arise from the perineural tissue rather than from the nerve itself.

During hospitalization the patient developed additional lesions, the newer ones occurring on the back of the neck, forearms, and sides of the fingers. A second biopsy specimen of a lesion distant from the first was reported as essentially the same. At the time of discharge

# Porencephaly

THEODORE H. WILSON, Jr. *Commander MC USA*

**T**HE TERM "porencephaly" is controversial. For the purpose of this discussion it means a defect in cerebral or cerebellar structure that appears as a cyst-like cavity. The defect communicates with the ventricles or the subarachnoid space, or, separated from the ventricles by a thin layer of brain tissue, it is covered on the outside by pia arachnoid and filled with a clear, often colorless fluid.

There are many theories of etiology, and considerable literature dealing with the pathology of this lesion. That such cyst-like structures could be of either congenital or acquired origin is apparent. Whether a partial agenesis, a vascular occlusion to some portion of fetal brain, intrauterine trauma of some sort, or intruterine infection can cause porencephaly is speculative. It is believed that birth trauma, subsequent trauma, or severe infections in the brain may produce the condition.

Relatively little has been published concerning the clinical recognition and treatment of porencephaly. Frequently, it is not diagnosed during life, either because there are no symptoms or because the symptoms are attributed to other conditions. The incidental finding of porencephaly at autopsy is not rare. These cystic structures have also been discovered quite unexpectedly during operation or air studies for suspected brain tumors.<sup>1</sup>

An epileptic seizure is the symptom that most often causes a patient with porencephaly to seek a physician's aid. The seizure may be Jacksonian or generalized. Mental retardation, motor weakness, speech defects, visual disturbances, or headache may be other presenting complaints. Symptoms generally are related to the location of the cyst, but the cyst may be huge and yet cause only minimal symptoms.

Findings on physical examination and routine roentgenography of the skull may be entirely normal. Occasionally examination will reveal motor deficits, speech defects, visual disturbances, asymmetry of the skull, mental retardation, or other findings that help in the localization of the lesion. Sometimes roentgenograms

6. Daubress J. L., and Bass R. A. propos d'un cas de tumeur d'Abrikos off a localisation double etude critique sur l'histogenese du soi disant myoblastome a cellules granuleuses *Arch. belges dermat. et syph.* 12: 208-216 Sept. 1956.
7. Ravich A., Strom A. P., and Ravich R. A. Malignant granular cell myoblastoma involving urinary bladder *Ann. Surg.* 121: 361-372 Mar. 1945.
8. Dunnington J. H. Granular cell myoblastoma of orbit *Arch. Ophth.* 43: 14-22 July 1948.
9. Ceelen W. Über die Natur des sog. Myoblastenmyome (zugleich ein Bericht über eine maligne Myoblastengeschwulst) *Zentralbl. allg. Path.* 85: 289-300 Sept. 15, 1949.
10. Ross R. C., Miller T. R., and Foote F. W., Jr. Malignant granular-cell myoblastoma *Cancer* 5: 112-121 Jan. 1952.
11. Ashbur L. L., and Rodger R. C. Myoblastomas neural origin: report of six cases, one with multiple tumors *Am. J. Clin. Path.* 22: 440-448 May 1952.
12. Klempner P. Myoblastomas of striated muscle *Am. J. Cancer* 20: 324-337 Feb. 1934.
13. Pearse A. G. E. Histogenesis of granular-cell myoblastoma (granular cell peripheral fibroblastoma) *J. Path. & Bact.* 62: 351-362 July 1950.
14. Powell E. B. Granular cell myoblastoma *Arch. Path.* 42: 517-524 Nov. 1946.
15. Papenfuss H. L. Personal communication.
16. Montgomery H. P. Personal communication.

cause while sleeping he had moaned incessantly, perspired profusely, could not be roused for fully 15 minutes, and was then lethargic and nauseated. His wife thought the patient was having a "seizure," and the ambulance attendant described jerky motions of the patient's legs and rolling back of his eyes. On admission the patient appeared confused and drowsy. He had no headache and there was no evidence that he had bitten his tongue or had had involuntary micturition or defecation. His wife stated that he had had highly spiced food for supper and afterward had two "highballs" but had gone to bed feeling well.

Physical and neurologic examinations revealed no abnormal findings and routine blood and urine tests were normal.

Further questioning when the patient was more alert disclosed that a week prior to admission he had had a boil in the right nostril lanced and subsequently had had swelling of the right eyelids that required antibiotic medication. Repeated questioning disclosed no past history of head trauma. The patient's mother recalled no abnormalities of her pregnancy or delivery. There was no family history of epileptic seizures. Repeated physical examinations showed no abnormalities. The patient was left handed.

Spinal fluid obtained by lumbar puncture was clear, contained no cells, and had a normal protein content. An electroencephalogram had an abnormal pattern and photic stimulation produced a mild right frontal dysrhythmia with delta and theta activity. These findings coupled with the history of a recent virulent infection in the right nostril suggested the possibility of a silent, frontal lobe abscess. A pneumoencephalogram on 16 November 1956 disclosed moderate enlargement but no displacement of both lateral ventricles and the third ventricle. The anterior horn of the right lateral ventricle was blunted. Air was present in what appeared to be a cavity lying just anterior to the anterior horn of the right lateral ventricle and occupying the entire frontal lobe area from the coronal suture forward (fig. 1).

A right frontal craniotomy was done promptly. The bone over the lesion was very thin. The dura appeared normal but beneath it lay a large cystic space filled with clear fluid. This cavity extended from the anterior horn of the right lateral ventricle to the orbital roof and the crista galli. The falx and medial face of the left frontal lobe could easily be seen. There was no identifiable brain tissue forward of the ventricle except for a thin rim of yellowish tissue that arched up over the posterior portion of the cavity forming a partial roof. This was biopsied and proved to be brain tissue. The anterior cerebral artery along with other vessels of uncertain identity could be seen coursing unsupported through the cavity. Inasmuch as it appeared that the cavity communicated with the subarachnoid space, no further procedure was done save to replace the bone flap and suture the scalp. A postoperative roentgenogram of the skull is shown in figure 2.

of the skull show asymmetry of the facial skeleton, with atrophy or bony condensation on the affected side. Evidence of increased intracranial pressure is rare. Pineal shift, unexplained intracranial calcification, or erosion of posterior clinoids may suggest the necessity of further investigation.

An electroencephalogram may assist in lateralizing the lesion, but the diagnosis is made with an air study. The pneumoencephalogram may reveal the defect if there is ventricular or subarachnoid communication. A ventriculogram may show the cyst. Unusual cases have been reported in which a cystic cavity was entered unexpectedly by an exploring needle while searching for a suspected tumor mass.

There probably is not complete unanimity of opinion among neurologists and neurosurgeons as to the advisability of operative therapy of this condition in the first place and as to the type of operation in the second. In a small series of cases, there would appear to have been benefit from operation. The procedure used varies and has included simple incision of the cyst, partial or complete unroofing, total excision when the cyst is surrounded by removable scar, and cystoventriculostomy with or without choroid coagulation.<sup>1-4</sup>

The rationale for doing these operations is hard to explain, but the observed results seem to justify operative therapy. Patients who had epilepsy have been relieved of their symptoms by operation, some for many years, some apparently permanently. It would appear that when porencephaly had developed at birth or soon after, operation did not produce as good results as when the lesion presumably developed in later life, thus permitting other areas of the brain to assume the function of the absent portion. Those unusual cases in which there is increased intracranial pressure are helped by operation, those with mental retardation may show no further deterioration or may even improve.

The following case report illustrates the fact that an individual with a large cerebral defect, presumably originating early in life, may attain a high level of performance and have no symptoms for many years. While this report throws no light on the etiology of such lesions and the follow up is too short to be of any prognostic value, the necessity is demonstrated of a thorough study in all instances of convulsive seizures in an attempt to find a remediable lesion.

#### CASE REPORT

A 28 year old naval aviator with 10 years of active duty involving actual control of aircraft was brought by his wife to this hospital be-

Recovery was complicated only by two brief generalized, convulsive seizures on the fifth postoperative night. The patient was treated with Dilantin Sodium (brand of diphenylhydantoin sodium) and phenobarbital. Recovery was rapid; he was subsequently discharged from the naval service on medication and has resumed academic training for a business career.

### SUMMARY

Porencephaly frequently is first diagnosed at autopsy, or during air studies or operation for suspected brain tumor. This lesion often is not recognized because it may be asymptomatic or its symptoms may be attributed to other conditions.

Mental retardation, motor weakness, speech defects, visual disturbances, and headache may be produced by porencephaly. The patient seeks medical aid most often because of an epileptic seizure.

The findings on physical examination and routine roentgenograms of the skull may be entirely normal. The diagnosis is made by pneumoencephalography or ventriculography.

It appears that many patients with this defect are benefited by operation. The operative procedure used varies considerably.

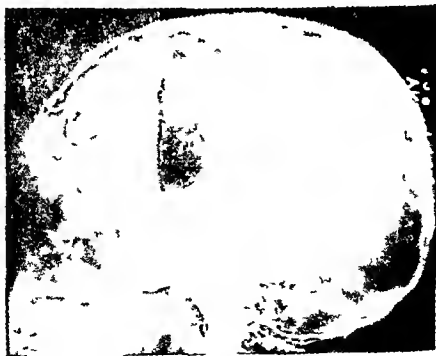
A case report illustrates that a patient with a large porencephalic defect, presumably originating early in life, may attain a high level of performance and have no symptoms for many years. It also demonstrates the need for thorough study of patients with convulsive seizures.

### REFERENCES

- 1 Love J G and Groff J E Porencephalic cyst: report of case. *Proc Staff Meet Mayo Clin* 14 709-712 Nov 8 1939
- 2 Patten C A Grant F C and Yaskin J C Porencephaly: diagnosis and treatment. *Arch Neurol & Psychiat* 37 108-136 Jan 1937
- 3 DeSanctis A G Green M and Larkin V deP Porencephaly. *J Pediatr* 22 673-689 June 1943
- 4 Crew J H and Grant F C Benign cysts of brain: analysis with comparison of results of operative and non-operative treatment in 30 cases. *J Neurosurg* 5 107-123 Mar 1948



*Figure 1 Pneumoencephalogram showing blunting of the anterior horn of the right lateral ventricle and air in a cavity in the right frontal lobe*



*Figure 2. Residual air in the porencephalic cyst relatively*

the United States to stimulate interest on the part of the medical and paramedical public in the care of mass casualties

One of the most far reaching developments in the Army Medical Service's educational program in the past 12 months is the implementation of the new Army wide, military tactical concept of having every soldier a first-aid man, if life is to be saved following a nuclear attack. Through a plan recommended by the Surgeon General of the Army, fully qualified Army Medical Service teams made up of officer and enlisted personnel are now giving basic individual first aid instruction at all U S Army training centers in the United States

Members of the teams are well qualified trainers in first aid, and are chosen for their skill in teaching as well as for their medical knowledge. Plans have been made to train during 1957, 2,100 "medics," the traditional medical aidmen of battle zones, in a 12 week course of concentrated and thorough instruction at the Army Medical Service School

If the beneficial effect of so many young, future physicians receiving instruction in the care of mass casualties along with their study of technical medical topics is certain to be a national defense asset, the new first-aid training concept for the American soldier can have no less an impact on our population. The soldier will return to his home community with more knowledge of how to save his own life or that of his fellows than possessed by any nonmedical soldier since the United States Army was founded

Eight Army Hospitals are conducting a course in acute trauma. This, in addition to providing continuous training for Army medical officers and commissioned ancillary personnel, is also open to civilian physicians and Reserve medical officers in their respective communities

It is anticipated that this year special instructional material in the general care of mass casualties will be issued for Reserve units. The subject is regarded as a part of the over all training in military medicine given to professional officers. Refresher courses that contain material on the medical aspects of nuclear weapons are now held for Reserve officers at the Army Medical Service School three times annually. In addition, spaces are allocated for Medical Corps reservists in the course on management of mass casualties

While this instruction is the central point of the Army Medical Service educational program of preparation, many radii of allied information are being channeled to those who will work beside the physician. Nurses, dentists, veterinarians, and certain mom-



bers of the Medical Service Corps and the Army Medical Specialist Corps will render emergency and definitive medical care commensurate with their abilities. Clinical specialists, aidmen, and hospital corpsmen are being taught to carry a greater share of the professional and logistical load.

There is no substitute for preparation and hard work in any successful large scale endeavor. This is particularly true for medical disaster preparedness. It is absolutely essential for civilian physicians to plan and program their medical civil defense responsibilities. There is a wealth of practical application and valuable information to be gained by civilian medical groups from the experience of the Army Medical Service in the management and care of mass casualties following a nuclear attack upon this nation.

---

#### MEDICAL ORGANIZATION IN NUCLEAR WARFARE

Successful offensive tactics in nuclear warfare depend on the development of small mobile self sufficient tactical elements capable of rapid dispersion and regroupment. Successful defense similarly depends on the development of units that will not offer an easy target for a nuclear weapon; they must be flexible and mobile yet linked by centralized control. The medical support in particular must include casualty treatment units widely dispersed in each community and capable of operating for short periods with communications destroyed. All individuals therein must be trained in first aid for assistance to both themselves and others. Organic medical support attached to tactical units must be as small as possible; all other supporting medical units must be mobile, widely dispersed, and centrally controlled. Rapid transportation must be available. Individuals concerned with medical care must be available for transfer to and from distant areas and they must be under some type of disciplinary control, the nature of which, whether civilian or military, should be decided before the emergency arises. Experience gained from a joint Army and Air Force maneuver in 1955 demonstrated these points but the pattern can also be adapted by civilian communities to the problem of supplying medical care under disaster conditions.

—MAJOR S. WHITE, Brig Gen, USAF (MC)  
in *Journal of American Medical Association*  
p. 959, Nov. 3, 1956

## GROUND BROKEN FOR NEW AIR FORCE SCHOOL OF AVIATION MEDICINE

Ground was formally broken for the new headquarters of the School of Aviation Medicine at Brooks Air Force Base, San Antonio Tex on 10 May 1957. Founded in 1918 at Hazelhurst Field, Long Island, N Y, the School of Aviation Medicine moved to Mitchel Field, Long Island the same year. In 1926 it was moved to Brooks Field Tex, and in 1931 to Randolph Field Tex.



*Major General Otis O. Benson Jr. Commandant School of Aviation Medicine delivering the introductory address at groundbreaking ceremonies Brooks Air Force Base Tex 10 May 1957. To the left is Lieutenant General Dean C. Strother Commander Air University.*

This new aviation medicine research and teaching institution will consist of five modern functional buildings with a central heating and cooling plant. The Research Institute building will house the School headquarters, the Aeromedical Library, and more than 100 individual laboratories. The Academic Building will be able to accommodate over

700 students in six different courses and will be equipped with closed circuit color television. This educational television linked with the Lackland Air Force Base Hospital will enable students to see actual patients and medical technics without leaving their classrooms.



*Symbolic ground breaking of new School of Aviation Medicine. Books Air Force Base Tex. by the Honorable Paul J. Kilday, United States House of Representatives. Watching this ceremony are left to right: Major General Dan C. Ogle, Surgeon General U. S. Air Force and Lieutenant General Dean C. Strother.*

The Flight Medicine Laboratory will accommodate the consultation services and provide space for clinical research in aviation medicine. The Research Laboratory Shops will provide for instrument fabrication.

medical photography and the electronic machines for processing te seatch statistical data The Altitude Laboratory will contain low pres sure chambers simulating the extreme nltitudes required for research in support of tomorrow's aircraft

During the five years spent in designing this establishment special ists in every field of medicine education and research have been con sulted to ensure that it will accommodate and adapt to the needs of the Air Force of tomorrow in the teaching research, and practice of the specialty of aviation medicine

Among those participating in the ceremony were the Honorable Paul J Kilday, United States House of Representatives, who has given the project zealous support in Congress Doctor Melvin A Casberg former Assistant Secretary of Defense (Health and Medical), representing the Department of Defense, Doctor Walter L Biering Chairman of the American Board of Preventive Medicine and Doctor Jan H Tillisch immediate past President of the Aero Medical Association The cere monies were presided over by Major General Otis O Benson Jr, Com mandant of the School of Aviation Medicine while the principal address was given by Congressman Kilday followed by symbolic ground break ing by Lieutenant Genetal Dean C Strother Commander of the Air University Major Genetal Dan C Ogle, Surgeon General of the U S Air Force and Congressman Kilday Other distinguished guests on the speakets platform on this histotic occasion were Lieutenant General John H Collier, Commanding General Fourth U S Army Fort Sam Houston Tex Mayor J Edwin Kuykendall of San Antonio and Doctor James P Hollets President of the San Anxonio Chamber of Commerce and former member of the Armed Forces Medical Policy Council

Visiting military dignitaries from the Office of the Surgeon-Gen tal of the Air Force included Major General Marvin E Kennebe ant for Dental Services Brigadier General Major S White Medical Staffing and Education and Brigadier General Byrnes Director of Professional Services while the major mandas were represented by the following surgeons Brigadier Clyde L Brothers Air Training Command Brigadier General E Lee, Tactical Air Command Brigadier General Albert H Schw berg Air Defense Command and Brigadier General Edward J Trac Materiel Command

Among the distinguished Army officers attending the ceremonies fro Fort Sam Houston were Lieutenant General John H Collier, Command ing General Fourth U S Army Major General Mark McClure, Deputy Commanding General Fourth U S Army Major General William E Shambora MC Commanding General Brooke Army Medical Center, Brigadier General Elbert DeCoursey MC Commandant Army Medical Service School and Brigadier General Dale B Ridgely DC Director of Dental Activities Brooke Army Medical Center

Of the many officers of the Air Force Medical Service who have worked from the onset of this project Colonel Frederick J Frese Jr has been cited for his indefatigable activities during the past five years in directing the planning of the institution and co-ordinating the project activities with various congressional committees and other interested agencies in Washington

---

### FINDING THE ANSWERS IN AVIATION MEDICINE

One of the interesting aspects of aviation medicine is the manner in which it responds to the challenging problems arising in present flight operations or to those created by considerations of future requirements. Frequently solutions are based upon the fusion of bits of information culled from many basic sciences and clinical subjects having application to the human factors involved in aviation. However where existing knowledge is meager or requires further extension research and development projects are initiated to provide answers. What is perhaps unique in the wide field of medicine is that these answers must be correct for upon them depend many lives and often tremendous economic investments.

—SIDNEY L. BRODY Capt MC USN  
in *Journal of Aviation Medicine*  
p 23 Feb 1957

## LEADERS IN MILITARY MEDICINE ATTEND RECEPTION FOR SECRETARY OF DEFENSE

A reception in honor of Secretary of Defense and Mrs Charles E Wilson was given by Assistant Secretary of Defense Frank B Berry on Friday 17 May 1957 at Fort McNair, Washington, D C The occasion afforded an opportunity for Secretary Wilson to meet in one group the eminent civilian advisers of the Department of Defense on medical and dental matters, and the leading administrators of military medicine and dentistry



*Reception line (left to right) Mrs William H Powell Jr Major General William H Powell Jr Deputy Surgeon General of the Air Force Mrs Bartholomew W Hogan, Rear Admiral Bartholomew W Hogan Surgeon General of the Navy Major General Silas B Hays Surgeon General of the Army Mrs Charles E Wilson Honorable Charles E Wilson Secretary of Defense Dr Frank B Berry Assistant Secretary of Defense.*

Among the 350 who attended the reception were members of the Department of Defense Civilian Health and Medical Advisory Council, Dependents' Medical Care Advisory Committee, and Dental Advisory Committee The Council members present were Dr Melvin A Casberg

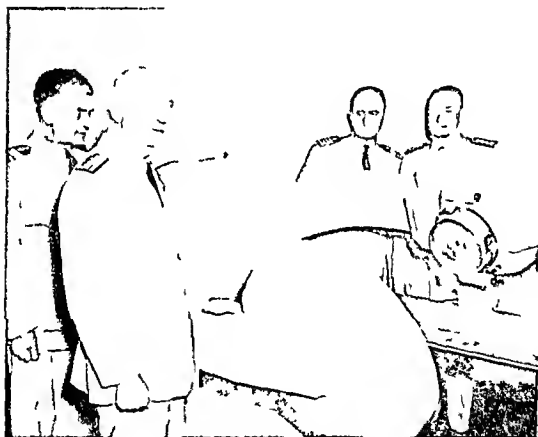
Austin Tex Dr Thomas P Fox Philadelphia Pa Dr Oscar P  
 Hampton St Louis Mo Dr James E McCormack New York N Y  
 Dr Anthony J J Rourke New Rochelle N Y Dr Wilburt C Davison  
 Durham N C Dr James P Hollers San Antonio Tex Dr Livingston  
 Parsons Jr New York N Y and Dr James L Tullis Boston Mass

The members of the Department of Defense Dependents Medical Care  
 Advisory Committee who attended were Dr Edwin S Hamilton Kanka  
 kee Ill and Dr Hugh H Hussey Jr Washington D C representing  
 the American Medical Association Dr Harry Lyons Richmond Va  
 and Dr William R Alstadt Little Rock Ark representing the American  
 Dental Association Dr Albert W Snoke New Haven Conn represent  
 ing the American Hospital Association Dr Paul R Hawley Chicago  
 Ill and Dr Arthur W Allen Boston Mass representing the American  
 College of Surgeons Dr Wallace M Yater Washington D C repre  
 senting the American College of Physicians Dr Malcolm E Phelps  
 El Reno Okla and Dr Fount Richardson Fayetteville Ark represent  
 ing the American Academy of General Practice Dr Howard B Hunt  
 Omaha Nebr and Dr Warren W Furey Chicago Ill representing the  
 American College of Radiology Dr Donald Stubbs Washington D C  
 representing the Blue Shield Mr E A van Steenwyk Philadelphia Pa  
 representing the Blue Cross Mr Edwin A Faulkner Lincoln Nebr  
 representing the Health Insurance Association of America Mr Steven  
 D Williams Hartford Conn representing the health and accident  
 insurance industry and Dr Dean A Clark General Director of the  
 Massachusetts General Hospital Boston Mass

The Department of Defense Dental Advisory Committee was repre  
 sented by Dr Thomas P Fox (also a member of the Council) Dr John  
 C Brauer Chapel Hill N C Dr Francis J Reichmann Oklahoma  
 City Okla Dr William R Alstadt (also a member of the Dependents  
 Medical Care Advisory Committee) Rear Admiral Ralph W Malone  
 Assistant Chief for Dentistry Bureau of Medicine and Surgery Depart  
 ment of the Navy Major General James M Epperly Chief Dental Di  
 vision Office of the Surgeon General Department of the Army and  
 Major General Marvin E Kennebeck Assistant for Dental Service  
 Office of the Surgeon General Department of the Air Force

## COBALT IRRADIATOR IN CLINICAL USE AT NATIONAL NAVAL MEDICAL CENTER

On 17 May 1957 a new cobalt irradiation therapy unit was dedicated at the National Naval Medical Center, Bethesda, Md. It is the first cobalt irradiation to be placed in clinical use in the Armed Forces and is also the first one in the Washington area. A second unit is at present being installed in the new surgical suite of the U S Naval Hospital San Diego Calif.



*Inspecting the new cobalt irradiation therapy unit are left to right Captain Edward C Kenney MC USN Rear Admiral Thomas F Cooper MC USN Captain S F Williams MC USN and Rear Admiral Bruce E Bradley MC USN*

The cobalt source in the Bethesda unit is of a strength of 500 curies. The unit is to be used in the therapy of selected patients with cancer and will enable delivery of high irradiation dosage levels to deep seated lesions. It is available by arrangement to all members of the Armed Forces and their dependents.

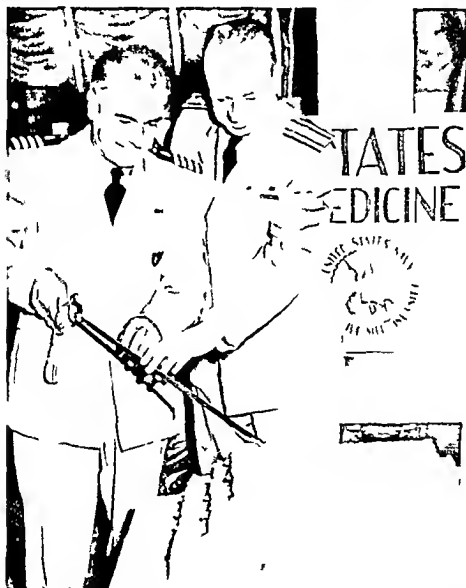


Participating in the ceremony were Rear Admiral Bruce E Bradley MC Deputy Surgeon General U S Navy who accepted the unit for the Bureau of Medicine and Surgery Rear Admiral Thomas F Cooper MC USN Commanding Officer National Naval Medical Center Captain Edward C Kenney MC USN Commanding Officer U S Naval Hospital Bethesda Md and Captain S F Williams MC USN Chief of Radiology U S Naval Hospital Bethesda Md who presided at the ceremony Rear Admiral Charles F Behrens MC USN (Ret) the first Chief of Radiology at the Naval Medical Center in 1942 and later Commanding Officer of the Naval Medical Research Institute also attended the dedication

---

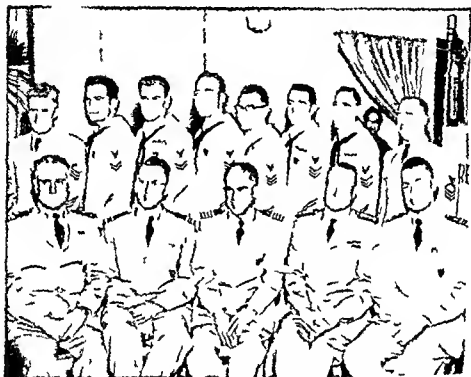
## NAVY PREVENTIVE MEDICINE UNIT COMMISSIONED AT NAPLES, ITALY

Preventive Medicine Unit Number Seven of the U S Navy was commissioned on 2 May 1957 at Naples Italy in ceremonies attended by high-ranking U S Army, Navy, and Air Force officers, NATO Southern Europe Commanders, and Italian health and government officials. Vice Admiral Charles R Brown USN, Commander, U S Sixth Fleet, sent a message of congratulations to the new unit.



*Rear Admiral Bruce E Bradley MC USN lends a helping hand to Captain Joseph M Coppoletta MC USN as he cuts a cake marking the commissioning of the unit*

Speaking at the commissioning ceremony Rear Admiral Bruce E Bradley Deputy Surgeon General, U S Navy said "The activation of this unit today is the result of a recent reorganization of Navy preventive medicine units throughout the world. These units are our front line forces who fight germs and viruses physical and chemical hazards and other health problems affecting our military forces and their dependents all over the world. Admiral Bradley stated that the current policy of the Bureau of Medicine and Surgery is to have



*Officers and hospital corpsmen of the new unit with Rear Admiral Bruce E Bradley Deputy Surgeon General U S Navy*

its units keep pace with the Navy's modern and rapidly developing forces equipped with guided missiles and nuclear power. The units are equipped to render completely mobile preventive medicine services and are ready to go on a moment's notice. The Deputy Surgeon General lauded the co-operation between the unit and Italian health officials in dealing with problems of mutual interest.

Captain Joseph M. Coppoletta MC USN assumed duties as the Officer in Charge of the new unit. Explaining its purpose, he said "Although our unit is based on land, the zone that is under our control goes from England to the Middle East. Our major customer will be the U S Sixth Fleet with her 25,000 men aboard 50 to 60 ships. It is for them and the thousands of their dependents that we are here to make possible through conferences, films and posters the defense

July 1957)

PRIVATIVI MEDICINI UNIT

1075

of their health and the elimination of sources of possible infection. Captain Coppoletta and his staff of three Medical Service Corps officers and eight hospital corpsmen are ready at any sign of epidemic hazard to reach by air any zone of the coast, from the Atlantic to the Mediterranean where American Military personnel are on duty, or any ship of the Sixth Fleet at sea or in port. Furthermore, the unit offers its services to the NATO forces, and in daily contact with Italian health authorities for a constant exchange of views and programs.

---

## FORMER EDITOR OF JOURNAL RECEIVES DECORATION

Colonel Robert J Benford USAF (MC) who was Associate Editor of this Journal from 1950 to 1953 and Editor from 1953 to 1955 recently received the Commendation Ribbon and Second Oak Leaf Cluster. The medal was presented by Major General Dao C Ogle Surgeon General of the Air Force at a ceremony held in his office (see below)



The citation stated that Colonel Benford had distinguished himself while serving as a member of the Inter-service Committee for Dependents Medical Care. After detailed studies of the problems involved, Colonel Benford made significant recommendations for providing medical care to service dependents in civilian facilities. These recommendations were largely responsible for the enactment of the Dependents Medical Care Act.

The contents are divided into two parts. The first deals with the instruments and technics of perimetry, anatomic considerations and the normal visual field. Each subject is completely covered. The chapter on the vascular supply of the visual pathway is a lucid condensation and that on special perimetric technics clarifies the extinction phenomenon and shows how it may be employed advantageously. Perimetry with ultraviolet radiation and luminescent test objects is developed in a way that is certain to advance interest in this technic.

Part two deals with the interpretation of defects in the visual field and provides a splendid text as well as a full atlas of perimetric diagnostic data. The author's rich background is clearly apparent. The illustrations, diagrams and plates are excellent.

This book will surely become widely used as a text for students of neurology and ophthalmology as well as an authoritative reference work. —EDWARD A. HYAES, Capt. MC USA

THE PROBLEMS OF VISION IN FLIGHT AT HIGH ALTITUDE. AGARDograph No. 13 by Thomas C. D. Whiteside, Ph.D., M.B., Ch.B. Published for and on behalf of The Advisory Group for Aeronautical Research and Development, North Atlantic Treaty Organization by Butterworths Scientific Publications, London. 162 pages, illustrated. Distributed by Interscience Publishers, Inc., New York, N.Y. 1957. Price \$5.

The author has written an excellent summary of the new visual problems we are experiencing in the recent years of high altitude flight. He has accumulated the results of interviews with experienced pilots and has combined these with his own personal experiences at altitudes where most visual problems exist.

Measuring the accommodation of the eyes to determine "space myopia" has been done in a highly satisfactory manner. He has not only used subjective methods but has verified these findings with objective measurements of the accommodative state of the eye. He has shown that accommodative state of the eye. He has shown that accommodation is in constant activity, fluctuating about a level of 0.5 to 2.0 diopters. Because of this accommodation, subjects who were slightly hyperopic had better distant vision at high altitude. Space myopia occurs because of the empty visual field.

"Subjective haze" at high altitude was thought to be due to intraocular scatter or fluorescence. The author shows this is in error; the haze is due to a positive afterimage of the bright cloud floor combined with a low grade anoxia which prolongs the afterimage. He points out the fact that sun glasses are comfortable but visibility is not as good. Using an antiglare visor is nearly as effective in combating veiling glare due to intraocular scatter and does not decrease vision.

This book is highly recommended for all flight surgeons and any one else concerned with visual problems at high altitudes.

—JAMES L. FUELLING, Capt. MC USA

## Reviews of Recent Books

**UROLOGIC INJURIES IN GYNECOLOGY** Including Vesicovaginal Fistula Stress Incontinence and Ureteral Injuries by Henry C Falk M D F A C S A Series of Monographs Obstetrics & Gynecology edited by Claude E Heaton M D 285 pages 97 illustrations F A Davis Co Philadelphia Pa 1957 Price \$7 50

This monograph on urologic injuries is in essence the etiology prevention and management of urinary incontinence in the female It is divided into three sections vesicovaginal fistula stress incontinence and ureteral injuries

A brief history of vesicovaginal fistula with methods of repair are thoroughly described and include vesical fistulas after cesarean section and loss of the urethra Vaginal cystostomy is advocated over suprapubic cystostomy for diverting the urinary stream

Full coverage is given to the medical and surgical treatment of stress incontinence The author's surgical approach with amputation of the cervix or removal of the anterior cervical lip is explained in detail as are the fascial transplant operations and the Marshall Marchetti operation

In the prevention of ureteral injuries the anatomy of the ureter and its relation to pelvic pathology are discussed with justifiable emphasis Should ureteral injuries occur their management is covered at the time of surgery and following the completion of the operative procedure

In this volume Dr Falk completely covers the problems of the gynecologist when confronted with urologic injuries in a readable well illustrated and concise manner He clearly defines policies procedures and techniques which have proved successful for him and his group This volume is a must for the gynecologist of particular value to the urologist and of interest to the general surgeon

—WILLIAM C. HERNQUIST Lt Col USAF (MC)

**THE VISUAL FIELDS** A Textbook and Atlas of Clinical Perimetry by David O Harrington A B M D F A C S 327 pages 234 illustrations and 9 color plates The C V Mosby Co St Louis Mo 1956 Price \$16.

Occasionally while reading through a new textbook the conviction grows with each passing chapter that here indeed is a volume that will become a new teaching classic There are a number of reasons for feeling that this text is one of those few The writing is succinct and easily followed There is maximal information and minimal verbosity

July 1957)

The contents are divided into two parts. The first part deals with the instruments and techniques of perimetry and the second part deals with the normal visual field. Each subject is covered in a separate chapter on the vascular supply of the visual pathway, a chapter on condensation and that on special perimetric techniques, the extinction phenomenon and shows how it may be employed advantageously. Perimetry with ultraviolet radiation and fluorescence of the subjects is developed in a way that is certain to advance interest in this technique.

Part two deals with the interpretation of defects in the visual field and provides a splendid text as well as a full atlas of perimetric diagnostic data. The author's rich background is clearly apparent. The illustrations, diagrams, and plates are excellent.

This book will surely become widely used as a text for students of neurology and ophthalmology as well as an authoritative reference work. —FREDERICK H. HARRIS, Case Western Reserve University

THE PROBLEMS OF VISION IN FLIGHT AT HIGH ALTITUDE. ACADEMIC Press, Inc. No. 13 by Thomas C. D. Whitely, M.D., M.B., Ch.B. Published for and on behalf of The Advisory Group for Aeronautical Research and Development, North Atlantic Treaty Organization by Butterworths Scientific Publications, London. 162 pages illustrated. Distributed by Interscience Publishers, Inc. New York N.Y. 1957. Price \$5.00.

The author has written an excellent summary of the new visual problems we are experiencing in the recent years of high altitude flight. He has accumulated the results of interviews with experienced pilots and has combined these with his own personal experiences at altitudes where most visual problems exist.

Measuring the accommodation of the eyes to determine "space myopia" has been done in a highly satisfactory manner. He has not only used subjective methods but has verified these findings with objective measurements of the accommodative state of the eye. He has shown that accommodative state of the eye. He has shown that accommodation is in constant activity, fluctuating about a level of 0.5 to 2.0 diopters. Because of this accommodation, subjects who were slightly hyperopic had better distant vision at high altitude. Space myopia occurs because of the empty visual field.

"Subjective haze" at high altitude was thought to be due to intraocular scatter or fluorescence. The author shows that this haze is due to a positive afterimage of the bright cloud floor combined with a low grade anoxia which prolongs the afterimage. He points out the fact that sun glasses are comfortable but not helpful in reducing glare. Using an antiglare visor is nearly as effective in combating trailing glare due to intraocular scatter and does not decrease vision.

This book is highly recommended for all flight surgeons and anyone else concerned with visual problems at high altitudes.

—JAMES L. FULLING, Capt. MC USAF



A great deal is known about the liver its functions and its diseases and there is a great body of writing on the subject. However it is beyond the ability of most of us to sift out facts and tenable concepts which can be used in the understanding and treatment of patients with hepatic disease. The authors have done this for us in a thorough detailed and satisfying fashion. With a lifetime of experience in the field of liver disease the authors have produced a text which will make our approach to the patient more rational and knowledgeable though possibly not more effective. They attempt to correlate the clinical and laboratory manifestations of liver disease with the morphologic changes in the liver. At present the correlation is far from satisfactory.

The book begins with a succinct description of the structure of the hepatic cell and of the metabolic processes which take place within it. There follows a discussion of the structure and function of the sinusoids biliary system blood vessels lymphatics nerves stroma and then of the whole organ. Having laid the firm foundation of the normal situation consideration is given to the various pathophysiologic processes which may affect the hepatobiliary system.

The latter half of the book is devoted to description of the various liver diseases and to the effect on the liver of diseases of other body systems. Generous use of cross references permits elimination of repetitious description of previously described basic pathologic reactions. Liver tests and diagnostic methods are thoroughly discussed in a separate chapter. There is an appendix entitled Principles of Diagnosis of Liver Disease Based on Coordinated Use of Functional and Structural Observations.

The book is well printed beautifully illustrated and adequately bound. Two unusual features are very commendable. All of the 3735 bibliographic references are assembled in a section at the end of the volume and arranged alphabetically and there is a seven page addendum summarizing work reported too late for inclusion in the body of the text. This is arranged by appropriate chapter headings and the table of contents lists the addendum and page reference under each chapter where applicable.

This volume should be in the library of each hospital and of each pathologist and internist with special interest in liver disease.  
 —BENJAMIN H SULLIVAN Jr Col MC USA

PHYSIOLOGIC PRINCIPLES OF SURGERY edited by Leo M Zimmerman  
 M D and Rachmael Levine M D 988 pages illustrated W B  
 Saunders Co Philadelphia Pa 1957 Price \$15

Doctors Zimmerman and Levine have done an excellent job of editing and clearing the contributions of the 50 authors thereby avoiding

repetition and wearisome historical verbiage. In this text has been combined much recent work previously available only in journals or monographs. It is an excellent reference text, contains chapters which every surgeon will want to read, and the specialized surgeon will enjoy that portion of the book pertaining to his particular field.

The chapters consider such broad topics as transplantation of tissues, blood transfusions, body fluids and electrolytes, pain and anesthesia, and then proceed to physiology as applied to congenital and acquired lesions of the various organ systems.

While the book is concerned primarily with clinical physiology, this is correlated throughout with embryology, clinical characteristics, laboratory aids, and treatment as required to make a coordinated presentation.

The type is legible, quality of paper is excellent, and the illustrations are clear. References appear at the end of each chapter and are voluminous.

This book is unique since it provides an authoritative reference source in the field of surgical physiology. It should be in every medical library and will probably become required reading for surgeons approaching examination for certification. —DAVID E. THOMAS, Lt Col MC USA

**CLINICAL USE OF RADIOISOTOPES.** A Manual of Technique, edited by Theodore Fields, M. S., F. A. C. R. (Assoc.) and Lindon Seed, M. D., 17 contributors, 455 pages, illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1957. Price \$9.50.

The editors have provided a book containing accepted techniques being used in the field of clinical radioisotopes. The material is excellently presented.

The contributing authors are all well qualified in their field. Although they have selected for detailed description only those procedures which they consider to be most representative of the techniques giving the most accurate results in their experience, a comprehensive bibliography is included at the end of each chapter. The editors are to be complimented on the excellence of the bibliographies which contain references not only to the techniques described in each chapter but also refer to variations of these techniques.

The order of presentation of the various isotopes and procedures used in clinical medicine affords a clear and concise understanding of the field. To complete their presentation, problems concerning requirements of the Atomic Energy Commission, facilities, personnel, equipment, and health physics have been considered in detail, and recommendations have been provided by scientists experienced in these areas. This section, frequently neglected in the literature, is of great value. The appendixes, including a glossary, statistical data, and a record of report sheets, are also of great value.

This manual of technic should be of great value to the physician who uses radioisotopes clinically and should be of equal value to the administrators who are consulted concerning the setting up of radio isotope programs. It is a very worthwhile book for all professional people interested in this field — EDWARD A. LANGDON Lt Col MC USA

**HANDBOOK ON POLIOMEYLITIS** by Joseph Treuta M D D Sc (Hon) (Oxon), F R C S (Hon) (Canada) F R C S A B Kinser Wilson M A M B, M R C P D P M and Margaret Agerholm M A B M B Ch (Oxon) 139 pages illustrated Charles C Thomas Publisher Springfield Ill 1956. Price \$3.75

There is a wealth of pertinent information in this little book that admirably suits the needs of the orthopedist and internist by outlining succinctly for their nonprofessional ancillary help many of the basic precepts that must be adhered to. The book adequately appraises the several views now held on the main problems related to the acute and chronic stages of poliomyelitis. It covers such things as the poliomyelitis viruses, their antibodies, epidemiology of poliomyelitis, factors precipitating frank disease, pathology, clinical description, management of the acute stage, respiratory complications, the transitional and recovery stage, and finally the management of permanent disability.

This makes an excellent and inexpensive reference work for all physicians and is good basic reading for medical students, physiotherapists, occupational therapists, and others interested in the subject — DAVID C. KELLSFY Lt Col USAF (MC)

**CLINICAL DENTAL ROENTGENOLOGY** Technic and Interpretation Including Roentgen Studies of the Child and the Adolescent by John Oppie McCall D D S, F A C D and Samuel Stanley Wald D D S F A C D 4th edition 466 pages 1415 illustrations on 529 figures W B Saunders Co Philadelphia Pa 1957 Price \$10

In this fourth edition the authors have maintained the high standards of presentation evident in the previous editions. Several changes and additions have been incorporated, notably a complete chapter on the long cone technic, rearrangement of the chapters on standard techniques for intraoral and extraoral films, a more complete coverage of the latest data concerning control measurement and effects of radiation, a more complete coverage of temporomandibular roentgenography, and complete studies of the child and the adolescent.

The increasing interest in the long cone technic has brought about equipment changes, increasing the voltage to 90 kvp at 15 ma. The authors present a standardized technic in a thorough manner with excellent photographs of patient and cone position and roentgenographic results obtained.

The section devoted to the production of roentgen radiation and the protective measures necessary gives a concise evaluation of the dangers imminent to all personnel involved in diagnostic and therapeutic

fields New devices for the detection and measurement of roentgen radiation are adequately described and established limits of safety given

The authors devote considerable attention to the important and often neglected diagnostic survey of the child In this section a graphic discussion of the growth phenomena is presented Such features as saturation in the mixed dentition are fully discussed and illustrated Techniques used in orthodontics and in temporomandibular articulation survey are emphasized

The chapters on roentgenographic description of important pathologic changes and the location of impactions and foreign bodies round out a well balanced and well referenced text

The appeal of this book is wide encompassing all associated with diagnostic roentgenographic evaluation and is of particular value to those of the profession preparing for State and Specialty Board examinations —EDWARD R HILDRETH Jr Capt DC USA

**PIONEER SURGEONS OF THE WOMAN'S HOSPITAL** The Lives of Sims Emmet Peaslee and Thomas, by James Pratt May M D 148 pages, illustrated F A Davis Co, Philadelphia Pa 1957

The Woman's Hospital opened in temporary quarters in New York City in 1855, and was chartered in 1857 This centennial volume offers brief lives of the four surgeons, James Marion Sims, Thomas Addis Emmet Edmund Randolph Peaslee and Theodore Gaillard Thomas "whose integrity, intelligence and painstaking efforts made that institution the most potent factor in the development of modern American gynecology" in the judgment of the late Dr James V Ricca

Dr May devotes one section to each biographee Each section is developed in such a manner that it might have stood alone, for in each the biographee is the focus while the other three colleagues are dimly seen There is no final explication of the complex personal and professional relationships between all members of the quarter The history of Woman's Hospital emerges in fragments from the four sketches Some data is necessarily repeated in each section but in general this problem has been skillfully handled The story is an interesting one and has been interestingly and straightforwardly told One wishes that some of the major developments of the period, such as the lagging introduction of anesthesia and the advent of "Listerism" might have been more fully portrayed

The book is replete with quotations from the writings of the four men and from other contemporary documents It is a great vexation that none of these quotations have the source specifically identified The short bibliographies at the end of each section are inconsistent in style and the entries are often inadequate to identify unequivocally the works cited —FRANK B ROGERS Lt Col MC USA

**CORONARY HEART DISEASE** Angina Pectoris Myocardial Infarction by Milton Plotz M. D. F A C P Foreword by William Dock M D 353 pages illustrated Paul B Hoeber Inc Medical Book Department of Harper & Brothers New York N Y 1957 Price \$12

In presenting a completely new text on the subject of arteriosclerotic heart disease the author poses for himself a particularly difficult task. Notwithstanding he has been successful to a remarkably effective degree.

The book is written to appeal to physicians of diverse professional backgrounds and varied primary interests and there is a considerable amount of material that will not be of interest to all readers. At the same time this necessary fault is minimized by a strict isolation of given topics within given chapters and a careful avoidance of repetition.

Many other considerations add to the effective presentation. The style of writing is clear and thoughts are presented in logical sequence. The current bibliography constitutes an excellent compendium of the classics on the subject which have been published in the last ten years. Of special interest is the correlation of presumed divergent concepts in the chapter on lipid metabolism. Clinical evaluation receives careful consideration as do the details of instrumental methods of supportive diagnosis. Medico-legal questions are included as well as the problems of impending infarction and prophylactic management. In general there is no clinically important aspect of the subject which has not been accorded a fair and searching appraisal. The physical form of the volume similarly reflects good organization and attention to deserving detail.

For these few of many good reasons this book is likely to be a much read and appreciated addition to most personal as well as larger medical libraries. —ROBERT B DICKERSON Lt Col MC USA

**RADICULAR SYNDROMES** With Emphasis on CHEST PAIN Simulating Coronary Disease by David Davis B S M D 266 pages illustrated The Year Book Publishers Inc Chicago Ill 1957 Price \$6 50

This brief text describes many radicular syndromes involving primarily the cervical and upper thoracic spine which produce chest pain or other symptoms which simulate coronary artery disease. The material is presented in a brief concise orderly manner and is read with ease. The author describes in adequate detail the various etiologies, the characteristics and locations of the various types of root pain, the sensory and motor signs, the symptoms and the roentgenologic findings seen in the various radicular syndromes. Methods of conducting many of the special examinations which will assist the reader in establishing an accurate diagnosis are described.

The illustrations used include black and white photographs, drawings and charts assist the reader in a better understanding of the material presented. The book is well edited in all respects and the format of the text is good. The bibliography is complete and current and is listed alphabetically by the author. The table of contents is adequate and the text is carefully indexed. The case reports are well selected and concisely presented and these emphasize and illustrate the various syndromes described by the author.

This book will prove to be of considerable value to the medical student, the general practitioner and to a lesser degree to the internist and cardiologist. It will also be useful to many of the other specialties. The general practitioner will definitely profit by having this volume in his library and it is well worth reading by all physicians.

—RALPH D. ROSS, Capt. MC USA

*Principles and Techniques of REHABILITATION NURSING*, by Florence Jones Terry, B. A. R. N. P. T. O. T. R., Gladys S. Benz, R. N. M. A., Dorothy Mereness, R. N. M. A., Frank R. Kleffner, Ph. D., and Deborah MacLurg Jensen, R. N. M. A. (Editor). 345 pages, illustrated. The C. V. Mosby Co., St. Louis, Mo. 1957. Price \$5.50.

This textbook, written by multiple authors, is a nice presentation of the many problems in rehabilitation. The authors, except for one, are all registered nurses who have had considerable experience in this field. Florence Jones Terry, the senior author, is a registered nurse, a physical therapist and an occupational therapist as well. She was former chief nurse at the Institute of Rehabilitation and Physical Medicine, New York Bellevue Medical Center. She calls upon her wide experience in formulating the major portion of this book. While the application of many principles utilized in physical rehabilitation are not always described in detail, there is considerable information in this text. It is certainly a concise and well-written book. It brings the team approach to the problem and highlights the basic philosophy that rehabilitation pays for itself.

I am sure the material on specific conditions, such as hemiplegia, arthritis, et cetera, will prove to be of great value to all interested in these problems. Likewise of considerable interest were the chapters on amputees and "Growing Through Illness." The latter because of the fact that the nurse plays a most important role in individualizing the management of illness in children. If there is any weakness in this book, it is a lack of further, detailed information on the handicapped child. This chapter is adequately covered from a psychiatric standpoint.

This book is recommended to all who are interested in rehabilitation and since each chapter has excellent questions for review as well as references. I believe it is a good textbook for both physical therapists and nurses in training. —EMMETT M. SMITH, Col. MC USA

**PEDIATRIC DENTISTRY** by M. Michael Cohen D M D 607 pages 395 illustrations including 9 in color The C V Mosby Co St Louis Mo 1957 Price \$14 75

This book is a composite of 17 chapters dealing with oral health in children. It is presented by many of the leading authorities in this field. It begins with the embryologic development of the head face and oral cavity and describes the physical and psychologic development of the child.

There is a very informative chapter on craniometry and cephalometry as applied to the growing child and the sections on operative and surgical problems in childhood are excellent. The need for special training and equipment in dealing with handicapped children is lucidly described and its importance with the present population growth is emphasized. The magnitude of this problem can be realized when one considers the fact that there are over 350 000 cases of cerebral palsy in this country. Inadequate dental treatment adds an additional burden to the already handicapped child as well as an additional cost to the parents and welfare organizations.

The photographic reproductions are good illustrate the subject matter well and were carefully selected. The roentgenographic illustrations are clear and have lost only minimal detail in reproduction. The sequence of topics discussed lead to continuity of the text and there is a current and detailed bibliography at the end of each chapter from which the authors have reported the latest developments.

This book has been designed in an attractive and readable form and the type size paper and binding make for ease in reading. The fact that the book is made up of contributions from many outstanding clinicians makes it an excellent reference book for anyone interested in the health and well-being of the child. It is a most worthy contribution to pediatric dentistry a field upon which insufficient emphasis has been placed.—**RICHARD J BURCH Col USAF (DC)**

**SYNOPSIS OF PATHOLOGY** by W A D Armstrong M A M D F R C P F C A P 4th edition 829 pages 328 text illustrations and 12 color plates The C V Mosby Co St Louis Mo 1957 Price \$8 75

The fourth edition of this book brings up to date one of the best texts to date on general pathology.

The title "Synopsis" is misleading because most pathologic conditions are adequately discussed and explained. The photographs mainly in black and white show excellent detail and properly illustrate the text. The references listed at the end of each chapter cover the recent literature and also older classic articles.

This text is highly recommended for anyone interested in general pathology.—**VERNON E MARTEYS Capt MC USN**

July 1957)

# RIVILTS OF RICIENT BOOI S

1057

PRACTICAL PSYCHIATRY FOR INDUSTRIAL PHYSICIANS by Donald Ross M.D., B.Sc. (Med.) F.R.C.P. (C) Foreword by Robert A. Kehoe, M.D., B.Sc. (Med.) F.R.C.P. (C) Preface by Maurice Levine A.M., M.D. 401 pages Charles C Thomas Publisher Springfield Ill 1956 Price \$7.50

In the foreword to this excellent text Dr Robert A Kehoe, professor of Industrial Medicine at the University of Cincinnati notes that Dr Ross has responded to the need of a new generation of industrial physicians by producing a source book from which they can obtain encouragement, advice and useful technical information. The scope of the applications of psychiatric principles and methods in industrial medicine thus revealed comes as an exciting surprise. Physicians in all branches of occupational medicine, military or non-military will welcome this book in the same spirit as Dr Kehoe.

The author first considers fundamental attitudes and basic techniques which are presented in terms richly interwoven into the occupational setting. The reader is prepared for later material by highly condensed, merry presentations of interviewing and examination diagnosis, psychology and social aids, psychotherapy and physical aids. Problems of neurologic diagnosis and evaluation of mental status are particularly well handled. Special attention is devoted to the criteria for practitioners to determine whether a person requires the services of a psychiatrist, general physician or a social agency. In a section entitled "Cooperation" the author reviews the position of medicine in the industrial social system. Reference is made to the great part played by medical services in the Armed Forces in developing industrial medicine.

Absenteeism, accidents, alcoholism, disability, motivation, rehabilitation and fatigue receive careful analysis, along with many other subjects to which psychiatric "know how" can make a critical contribution. Psychosomatic disorders including injuries to head and back, neurocirculatory asthenia and occupational dermatoses are very well covered. Dust exposure contains some of the author's previous study of this problem both from a statistical and clinical standpoint. Throughout this discussion of detailed problems, the role of the industrial physician as a participant observer of the problems of executives, foremen, supervisors, and women in industry is defined.

Dr Ross's book is based on his participation since 1948 in the training program for industrial physicians developed by the Kettering Laboratory. The beginnings of this work go back even further into the author's extensive experience in military psychiatry in World War II. There is a distinct challenge to all career military medical officers when the fighting stops: psychiatric lessons have been repeatedly mothballed and forgotten. In this book the author has restructured the hard learned lessons of people at war and applied them to people at peacetime work. Those who read his book will recognize its integrity and permanence. —JOHN C. MEBANE Lt Col USAF (MC)



**NEW AND NONOFFICIAL REMEDIES 1957** Containing Descriptions of Drugs  
 Evaluated by the Council on Pharmacy and Chemistry of the American  
 Medical Association An Annual Publication Issued Under the Direction  
 and Supervision of the Council 582 pages illustrated J B Lippincott  
 Co Philadelphia Pa 1957 Price \$3 35

This annual publication of the Council on Pharmacy and Chemistry of the American Medical Association contains descriptions of drugs evaluated on the basis of available scientific data and reports of investigations. It deals with agents proposed for medicinal or adjunctive use in or on the human body for the diagnosis prevention or treatment of disease.

Descriptions of drugs are presented under nonproprietary names in the form of monographs designed to provide the following information: chemical or biologic identity including pertinent properties actions and uses including associated side effects toxicity and precautions and dosage including routes of administration. Monographs are arranged alphabetically according to their nonproprietary titles and are grouped under chapters according to pharmacologic action or clinical use.

This is the second annual publication under the Council's revised program of operation for evaluation of drugs in which the scope of the book no longer is restricted only to descriptions of drugs having established uses but has been expanded to provide for inclusion of information on all available new drugs. More emphasis on basic information has been accomplished by the elimination of dosage forms and sizes the names of manufacturers and monographs describing ready prepared mixtures of two or more drugs. Forty two monographs have been added for drugs evaluated since the previous edition.

In the opinion of the reviewer this annual publication is a valuable reference for physicians and pharmacists.

—HENRY D ROTH Lt. Col. MSC, USA  
**DISEASES OF THE HEART AND CIRCULATION** by Paul Wood O B E  
 M D (Melbourne) F R C P (London) 2d edition 1 005 pages  
 illustrated J B Lippincott Co Philadelphia Pa 1956. Price \$15

In the first edition (1950) Dr Wood Director of the Institute of Cardiology London sought to maintain a proper balance between man and his instruments between experienced opinion and statistics between traditional views and the heterodox between bedside medicine and special tests between the practical and the academic and so to link the past with the present. The second edition on the other hand is written to elaborate the newer investigatory techniques physiologic concepts plus medical and surgical treatment. The author has succeeded admirably in attaining his objectives.

The text is arranged logically on a physiologic and etiologic basis. Each chapter ends with a fairly lengthy list of references which will be of value to the inquisitive mind. The opening chapters on the chief symptoms of heart disease and physical signs serve as an excellent entrée to the diagnostic and investigative procedures that follow. The

chapter on electrocardiography is succinct and lucid however the British method of mounting the electrocardiogram in relation to the Einthoven triangle tends to slow up the reader trained to analyze tracings by studying limb leads and precordial leads in separate groupings. Although the triaxial reference system is explained in determining the vector axis, no mention is made of the hexaxial reference system which lends itself more readily to vector force analysis. The chapter on special investigations should enable the practitioner to comprehend much of the state of literature in this field. Of the remaining chapters that are written with considerable clarity the ones on ischemic heart disease and hypertensive heart disease are outstanding. In view of Burgess' report in 1956 one might question the prognosis given in uncomplicated benign hypertension. The reviewer concurs with the author that this book is of value primarily for graduates interested in clinical cardiology and can meet the needs of students, general practitioners and specialist physicians in other fields of medicine.

In summary this textbook makes an ideal companion piece to the books of Paul D. White and Charles A. Friedberg.

—ARCHIE A. HOFFMAN Col USAF (MC)

**BASIC FOUNDATIONS OF ISOTOPE TECHNIQUE** For Technicians, edited by Willard C. Smullen M.D. F.A.C.R. 163 pages illustrated. Charles C. Thomas, Publisher, Springfield, Ill. 1956. Price \$4.75.

The editor has attempted to provide a book containing the basic background of isotope technic for medical technicians. As such he has accomplished his mission.

The material presented is based on a series of lectures by accepted authorities given as a course for technicians. The editor states that tape recordings of the original lectures were used as a basis for some of the material. Although this technic is worthwhile in that the presentation is thus pretested as to clarity and understanding on the part of the beginners in isotope procedure, it has the disadvantage of an occasional lapse in orderly presentation of the material. The basic fundamentals presented have been designed for personnel of the technical rather than the professional level.

A good background knowledge for the understanding of the technical procedures in the use of radioisotopes in medicine is provided with clarity and completeness. These procedures are discussed in a general way more to provide background information than to assure a "cook book" type of presentation. The illustrations, some of which are drawn from commercial sources, are adequate.

A glossary and appendix are included. The bibliography, although not extensive, contains most of the classic available literature related to the discussions.

This book provides a source of basic knowledge in a field so far neglected for technicians. As such it is worthwhile.

—EDWARD A. LANGDON LT Col MC USA

## New Books Received

Books received by the U S Armed Forces Medical Journal are acknowledged in this department Those of greatest interest will be reviewed in a later issue

A NAVY SURGEON IN CALIFORNIA 1846 1847 The Journal of Marius Orvall  
edited by Fred Blackburn Rogers 114 pages Published by John Howell  
San Francisco Calif 1957

ESSENTIALS OF CLINICAL PROCTOLOGY by Manuel G Spiesman M D  
B S L L O F I C P and Louis Malou M O B S F A C S  
3d edition Grune & Stratton Inc New York N Y 1957 Price \$8 75

LOCAL ANESTHESIA AND PAIN CONTROL IN DENTAL PRACTICE by  
Leonard M Monheim B S M S O O S 299 pages illustrated  
The C V Mosby Co St Louis Mo 1957 Price \$8 75

THE YEAR BOOK OF ORTHOPEAICS AND TRAUMATIC SURGERY (1956 1957  
Year Book Series) edited by Eduard L Compere M O F A C S  
F J C S 336 pages illustrated The Year Book Publishers Inc  
Chicago Ill 1957 Price \$6 75

THE LEUKEMIAS Etiology Pathophysiology and Treatment Edited by John  
W Rebeck Frank H Bethell and Raymond W Monto A Henry Ford  
Hospitals International Symposium 711 pages illustrated Academic  
Press Inc New York N Y 1957 Price \$13

ORAL DIAGNOSIS AND TREATMENT (Oral Medicine) A Textbook for Students  
and Practitioners of Oentistry and Medicine by Samuel Charles Miller  
O O S F A C O F A O M and 37 contributors with an introduc  
tion by Raymond J Nagle O M O F A C O 3d edition 977 pages  
577 illustrations in black and white and 30 color plates The Blakiston  
Division McGraw Hill Book Co Inc New York N Y 1957 Price \$16

FUNDAMENTALS OF MICROBIOLOGY by Martin Frobisher Sc O 6th edition  
617 pages illustrated W B Saunders Co Philadelphia Pa 1957

O'Leary's OBSTETRICS FOR NURSES by M Eduard Davis M O and Cath  
arine E Sheckler R N M A With a Foreword by Ann Kriebner 16th  
edition 625 pages illustrated W B Saunders Co Philadelphia Pa  
1957

Recommended Practice for DESIGN EQUIPMENT AND OPERATION OF SWIM  
MING POOLS AND OTHER PUBLIC BATHING PLACES 10th edition  
This Report is Official with the American Public Health Association  
and the Conference of State Sanitary Engineers Prepared by the Joint  
Committee on Bathing Places of the Conference of State Sanitary  
Engineers and the Engineering and Sanitation Section of the American  
Public Health Association. Approved by the Conference of State Sanitary  
Engineers The Engineering and Sanitation Section The Committee on  
Research and Standards and by the Governing Council of the American  
Public Health Association 60 pages Published by the American Public  
Health Association Inc New York N Y 1957 Price \$1

ENCYCLOPEDIA OF NURSING by Helen F. Hansen R N, M A  
406 pages illustrated in 8 colored plates The Blakiston Division  
McGraw Hill Book Co, Inc, New York, N Y 1957 Price \$6

VEGETABLE OILS IN NUTRITION With Special Reference to Unsatuated  
Fatty Acids, by Dorothy M Rathmann Ph D 70 pages illustrated  
Published by the Corn Products Refining Co, New York N Y, 1957

ALCOHOLISM A Treatment Guide for General Practitioners by Donald W  
Heustell M D 112 pages Lea & Febiger Philadelphia Pa 1957  
Price \$3

ANNALS OF THE NEW YORK ACADEMY OF SCIENCES Volume 66 Art 3,  
Pages 417-840 March 14 1957 Editor in Chief, Otto V St Whitelock,  
Associate Editor Franklin N Furness "THE PHARMACOLOGY OF  
PSYCHOTOMINETIC AND PSYCHOTHERAPEUTIC DRUGS" Con-  
ference Chairman and Consulting Editor Seymour S Kety 123 pages  
illustrated The New York Academy of Sciences New York, N Y,  
1957 Price \$5

ANNALS OF THE NEW YORK ACADEMY OF SCIENCES Volume 66 Art 4  
pages 841-1022 April 2 1957 Editor in Chief Otto V St Whitelock  
Managing Editor Franklin N Furness, "ANESTHESIOLOGY AND RE-  
LATED PROBLEMS." Conference Co-Chairmen G R Stephen and  
E J deBeer 180 pages illustrated The New York Academy of Sci-  
ences New York N Y, 1957 Price \$4

ANNALS OF THE NEW YORK ACADEMY OF SCIENCES Volume 64 Art 5  
pages 735-1073 March 22 1957 Editor in Chief Otto V St Whitelock  
Associate Editor Franklin N Furness "SECOND TISSUE HOMO-  
TRANSPLANTATION CONFERENCE" Conference Chairmen John  
Marquis Converse and Blair O Rogers 338 pages, illustrated The  
New York Academy of Sciences, New York N Y 1957 Price \$1.50

ANNALS OF THE NEW YORK ACADEMY OF SCIENCES Volume 65 Art 5  
pages 357-652 April 11 1957 Editor in Chief Otto V St Whitelock  
Associate Editor Franklin N Furness "MERCURY AND ITS COM-  
POUNDS" Conference Chairmen Cecil V King Harry Gold, and  
Harold Wolff 295 pages illustrated The New York Academy of Sci-  
ences New York N Y 1957 Price \$3.50

HEMORRHAGIC DISEASES by Armand J Quick Ph D M D 451 pages  
37 illustrations Lea & Febiger Philadelphia Pa 1957 Price \$9.50

MENTAL DEPRESSIONS AND THEIR TREATMENT by Samuel Henry Kramers  
M D 555 pages illustrated The Macmillan Co, New York, N Y,  
1957 Price \$8

BLOOD TRANSFUSION IN CLINICAL MEDICINE by P L Hollison M D  
M R C P 2d edition 587 pages illustrated Charles C Thomas,  
Publisher Springfield Ill 1956 Price \$9

EPILEPSY Grand Mal, Petit Mal Convulsions, by Letitia Fairfield C B E  
M D, D P H 159 pages illustrated Philosophical Library Inc,  
New York N Y 1957 Price \$4.75

Hutchison's CLINICAL METHODS by Donald Hunter M O F R C P,  
and R R Bomford D M, F R C P 13th edition 452 pages illus-  
trated in color J B Lippincott Co Philadelphia Pa, 1957 Price \$6

BIOLOGY 3d edition by Claude A Villee Harvard University 591 pages  
illustrated W B Saunders Co Philadelphia Pa 1957

- PRINCIPLES OF SURGICAL PHYSIOLOGY** by Harry A. Davis M. O. C. M.  
F. A. C. S. Foreword by Lester R. Dragstedt M. D. F. A. C. S. 841  
pages illustrated Paul B. Hoeber Inc. Medical Book Dept. of Harper  
& Bros. New York N. Y. 1957 Price \$20
- MODERN THERAPY IN NEUROLOGY** edited by Francis M. Forster M. D.  
Foreword by H. Houston Merritt M. D. 72 pages The C. V. Mosby Co.  
St. Louis Mo. 1957 Price \$12
- PERINATAL LOSS IN MODERN OBSTETRICS** by Robert E. L. Vesbitt, Jr.  
M. O. A Series of Monographs in Obstetrics & Gynecology edited by  
Claude E. Heaton, M. D. 432 pages; 108 illustrations including 10 in  
color F. A. Davis Co. Philadelphia Pa. 1957
- PRACTICAL GYNECOLOGY** by Walter J. Reich M. O. F. A. C. S. F. I. C. S. 2d edition  
and Mitchell J. Veckhou M. D. F. A. C. S. 254 illustrations including 68 subjects in color J. B. Lippin-  
cott Co. Philadelphia Pa. 1957 Price \$12.50
- A TEXTBOOK OF HISTOLOGY** by Alexander A. Maximow Late Professor  
of Anatomy University of Chicago and William Bloom, Professor of  
Anatomy University of Chicago 7th edition. 628 pages 1082 illus-  
trations 765 in color on 631 figures W. B. Saunders Co. Philadelphia  
Pa. 1957
- RYPIAN MEDICAL LICENSURE EXAMINATIONS** Topical Summaries and  
Questions edited by Walter L. Biering M. D. M. A. C. P. M. R. C. P.  
Edm. (Hon.) with the collaboration of a Review Panel 8th edition.  
964 pages J. B. Lippincott Co. Philadelphia Pa. 1957 Price \$10
- MODERN TRENDS IN GERIATRICS** edited by William Hobson, B. Sc. M. D.  
D. P. H. 42 pages illustrated Paul B. Hoeber Inc. Medical Book  
Dept. of Harper & Bros. New York N. Y. 1957 Price \$13.50
- THE TREATMENT OF BURNS** by Curtis P. Arnt M. D. F. A. C. S. Lt. Col.  
MC USA (Ret.) and Eric Reiss M. D. 250 pages 199 illustrations on  
105 figures Illustrations by Burr Bush W. B. Saunders Co. Phila-  
delphia Pa. 1957
- SURGICAL GYNECOLOGY** Including Important Obstetric Operations  
A Handbook of Operative Surgery by J. P. Greenhill M. D. Illustrated  
by Angela Barterbach 2d edition 377 pages illustrated. The Year  
Book Publishers Inc. Chicago Ill. 1957 Price \$9.50
- CLINICAL NEURO-OPHTHALMOLOGY** by Frank B. Walsh M. O. F. R. C. S.  
(Ed.) O. Sc. (W. A. Hon.) 2d edition 1293 pages, illustrated The  
Williams & Wilkins Co. Baltimore Md. 1957 Price \$29
- TEXTBOOK OF PATHOLOGY** 7th Clinical Applications by Stanley L.  
Robbins M. D. 1350 pages illustrated W. B. Saunders Co. Phila-  
delphia Pa. 1957
- SOME MILESTONES IN THE HISTORY OF HEMATOLOGY** by Carlile Dreyfus  
M. O. Foreword by Sir Lionel E. H. Whitby 87 pages illustrated Grune  
& Stratton Inc. New York N. Y. 1957 Price \$4.50
- PSYCHOTHERAPY OF THE ADOLESCENT** edited by Benjamin Harris Balser  
M. O. 270 pages International Universities Press Inc. New York  
N. Y. 1957 Price \$5

## Contents

UNITED STATES ARMY MEDICAL DEPARTMENT	Page
Asama Monsani in Puerto Rican	1093
Robert M. Wells	1102
Ayres and Bruce M. Cameron	1118
Wilber	1121
En Enema Containing an Enzyme	1131
Miller	1135
Kins	1152
Palliative Therapy With Depo	1160
Published in the Armed Forces Medical Department	1169
he Spermatozoa Releasing Prin	1171
Morris D. Schneider Melvin A.	1180
ens in Pregnancy Test in Sum	1189
Prevention Program	1195
George	1201
Recruits	1208
Erwin L. Burke	1214
Wales	1222
as N. Page and Spurgeon H.	1226
Ed	1229
CAPTAIN BENNETT Fent in a Military Situation	1230
Associate	
COLONEL ROBERT S.	
COLONEL ROBERT J.	
Harold M. Broder	1230
S. Johnson Edwin J. Pulaski	1230
59 Years	1230
Louis J. Loscalzo	1230
UNITED STATES GOVERNMENT PRINTING OFFICE	1230
WASHINGTON	1230
to Commanding General of	1230

## TABLE OF CONTENTS—Continued

Page

## DEPARTMENTS—Continued

Meeting of Section on Military Medicine	Scientific Assembly of	1231
A M A		1233
Deaths		1234
American Stomatological Society of Japan Sponsors Conference		1235
Officers Certified by Specialty Boards		
BOOKS		
Reviews of Recent Books		1236
New Books Received		1246

## Foreword

The *United States Armed Forces Medical Journal* is the medium for disseminating information of administrative and professional interest to all medical personnel of the Department of Defense. The Assistant Secretary of Defense (Health and Medical) and the Surgeons General of the several services invite all medical officers, dental officers, Medical Service Corps officers, Nurse Corps officers and officers of the Veterinary Corps of the Armed Forces and the medical consultants of the Army, Navy and Air Force to submit manuscripts for publication in this journal.

FRANK B BERRY M D  
Assistant Secretary of Defense (Health and Medical)

MAJOR GENERAL SILAS B HAYS  
Surgeon General United States Army

REAR ADMIRAL BARTHOLOMEW W HOGAN  
Surgeon General United States Navy

MAJOR GENERAL DAN C OGLE  
Surgeon General United States Air Force

# UNITED STATES ARMED FORCES MEDICAL JOURNAL

---

Volume VIII

August 1957

Number 8

---

## OBSERVATIONS ON INFESTATION BY SCHISTOSOMA MANSONI IN PUERTO RICAN TROOPS

WILLIAMS HAUBRICH *Captain MC USAR*  
ROBERT M WELLS *First Lieutenant MC USAR*

**A**MONG THE most common and important trematodes infesting man is the genus *Schistosoma*. It is estimated that approximately 114 million persons, or 5 per cent of the entire human population, harbor this parasite.<sup>1</sup> The worldwide scope of infestation may be subdivided into three categories according to the species involved, pathogenesis, and geographic distribution.

There are three principal species that infest man: *mansonii*, *haematobium*, and *japonicum*. The cercariae and adult forms of this triad, often called "blood flukes," share a predilection for the portal venous system. The female schistosome deposits her ova within venules draining the abdominal viscera. Clinical disease in the human host results from the granulomatous reaction to the ova which, in essence, are foreign bodies.

The disease produced by the species *mansonii* usually is limited to the intestines and liver, abdominal pain and dysentery are often the presenting symptoms. Of the estimated 29 million individuals infested by *S. mansonii*, about four fifths are Africans. The remainder of the infestation is in the tropical Americas which include Puerto Rico.

---

From the Gastroenterology Service, Madigan Army Hospital, Tacoma, Wash. Dr. Haubrich is now at the Henry Ford Hospital, Detroit 2, Mich.



## TABLE OF CONTENTS—Continued

## DEPARTMENTS—Continued

	Page
Meeting of Section on Military Medicine Sentific Assembly of A. M. A. ....	1231
Deaths .....	1233
American Stomatological Society of Japan Sponsors Conference .....	1234
Officers Certified by Specialty Boards .....	1235
BOOKS	
Reviews of Recent Books .....	1236
New Books Received .....	1246

## Foreword

The *United States Armed Forces Medical Journal* is the medium for disseminating information of administrative and professional interest to all medical personnel of the Department of Defense. The Assistant Secretary of Defense (Health and Medical) and the Surgeons General of the several services invite all medical officers, dental officers, Medical Service Corps officers, Nurse Corps officers and officers of the Veterinary Corps of the Armed Forces and the medical consultants of the Army, Navy and Air Force to submit manuscripts for publication in this Journal.

FRANK B. BERRY, M.D.  
Assistant Secretary of Defense (Health and Medical)

MAJOR GENERAL SILAS B. HAYS  
Surgeon General, United States Army

REAR ADMIRAL BARTHOLOMEW W. HOGAN  
Surgeon General, United States Navy

MAJOR GENERAL DAN C. OGLE  
Surgeon General, United States Air Force

their native island a year or less. Their occupations prior to entry into service varied widely, and no correlation between infestation and vocation was apparent.

Infestation by schistosoma was demonstrated in 15 (35 per cent) of the 43 patients. Only one of the total group confessed to a prior knowledge of infestation by "bilharzia", the remainder of the group seemed unaware that such a disease as schistosomiasis existed.

Information regarding residence of each subject within Puerto Rico was elicited (fig. 1). Of the 15 infested individuals, only 3 claimed the large urban areas of San Juan and Ponce as their

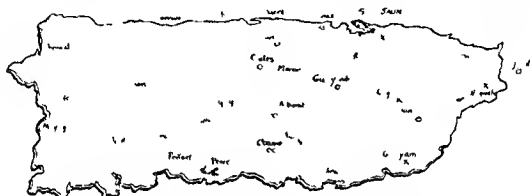


Figure 1 Topographic distribution by prior residence of 43 subjects among the cities and villages of Puerto Rico. X denotes an infested individual and O denotes a noninfested individual.

homes. However, when viewed in the light of the island population as a whole and the number of noninfested individuals from the hinterland, no remarkable correlation between residence and infestation is apparent.

No patient in this group had complaints that could be directly attributed to schistosomiasis. There was no significant difference between the incidence of infestation among those patients admitted to the hospital because of digestive symptoms and that found among those admitted because of unrelated injuries and illnesses. When present, digestive complaints were protoan and nondescript, e.g., anorexia or sitophobia, and postprandial nausea.

The general physical examination gave no clue that infestation existed. In none of the group in whom liver biopsy revealed focal granulomas was the liver palpably enlarged. No splenomegaly was encountered.

In the majority of subjects the hemogram was within normal limits. Eosinophilia of slight to moderate degree was common.

ally recorded with eosinophilia, however, there was almost invariably evidence of infestation by parasites other than *S. mansoni*. Notably these parasites included hookworm, whipworm, and strongyloides in various combinations. There was significant anemia in only one of the patients studied.

In four of the infested individuals a similar, although hardly pathognomonic abnormality in the rectal mucosa was observed by sigmoidoscopy. This consisted of a patchy, fine granularity in which small, punctate hemorrhages were elicited with only gentle swabbing (fig. 2). Except for its patchiness, this change

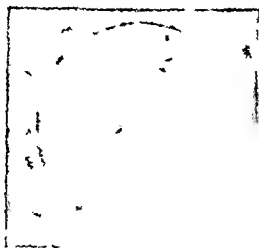
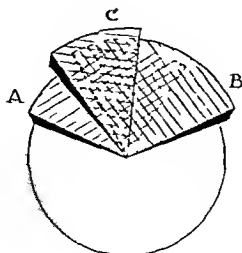


Figure 2 Photograph taken through the sigmoidoscope of rectal mucosa laden with granulomas of *S. mansoni*. The surface was faintly granular and punctate hemorrhages were induced by gentle swabbing.

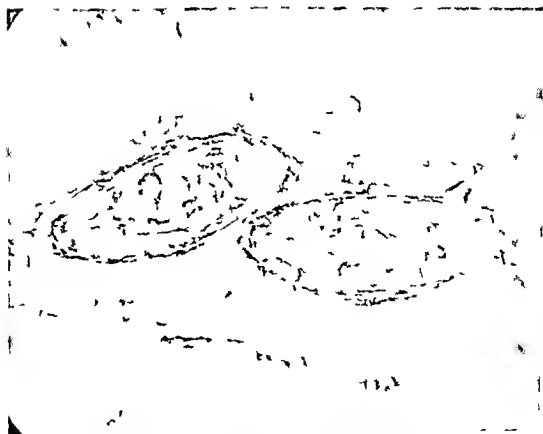
resembled that observed in early idiopathic ulcerative colitis. The mucous membrane of the rectosigmoid segment appeared grossly normal in the remaining three fourths of infested subjects, including those in whom the mucosa was laden with microscopic granulomas.

With one exception no other focal lesions were observed within the rectosigmoid colon. This important exception, a 23 year old soldier admitted because of bloody diarrhea, was found to have coexisting granulomatous polyps and an extensive adenocarcinoma of the rectum.<sup>2</sup>

Figure 3 graphically depicts the results of definitive diagnostic studies represented by the triad of coprology, sigmoidoscopic biopsy, and liver biopsy in 15 infested persons. A search of the stool yielded the easily identified ovum of *S. mansoni* in about two thirds of those harboring the parasite (fig. 4). In only

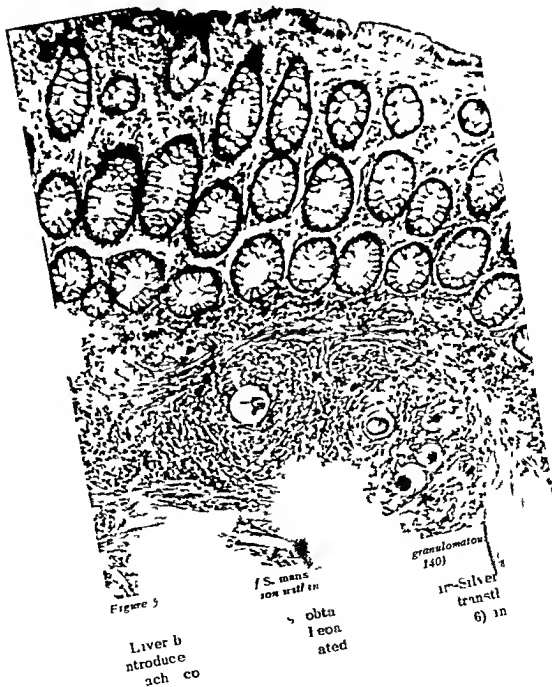


*Figure 3 Incidence of infestation (35 per cent) and results of diagnostic studies among 43 native Puerto Rican soldiers. Sector A represents number of subjects with positive coprology (11); sector B positive rectal biopsies (11); and sector C positive liver biopsies (5).*



*Figure 4 Typical lateral spined ova of S. mansoni recovered from a stool ( $\times 640$ )*

3 patients were ova laden stools the only sign of infestation. In two thirds of the infested group the rectal mucosa contained focal granulomas surrounding the embedded ova (fig 5). In 4 patients the rectal biopsy provided the sole evidence of infestation.



of the affected individuals. Because only patients found to have evidence of infestation were subjected to liver biopsy, we cannot state the number of patients from our group in whom the liver may have provided the only sign of schistosomiasis. There were no instances of frank cirrhosis.

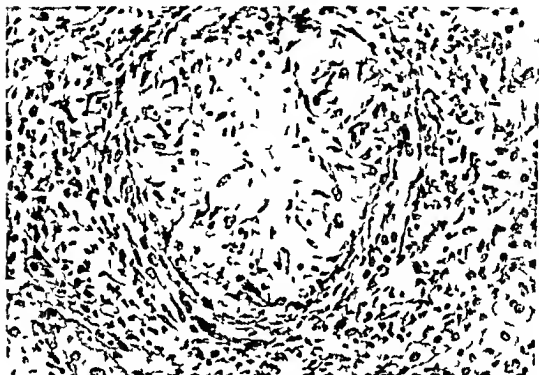


Figure 6. Granuloma induced by *S. mansoni* within liver (Reduced one third from  $\times 900$ )

In four patients the complete triad of positive stool and granulomas in both the rectal mucosa and liver was obtained.

The first eight, or about one half, of the patients in whom objective evidence of infestation was determined were subjected to treatment. Intravenous antimony potassium tartrate, reportedly the preferred therapy,<sup>5</sup> was used alone in six cases. Gaudin was given intramuscularly in one patient in whom repeated venipuncture was not feasible. Another patient received a full course of both drugs. Not only did a course of antimony potassium tartrate impose at least four weeks' additional hospitalization, but invariably the subjective reaction to adequate doses exceeded the complaints with which the patients had originally been admitted. Among those individuals in whom the admitting symptoms might have conceivably referred to organs affected by the infestation, no subjective relief attended the protracted treatment. Therefore, attempts at definitive therapy were abandoned. It should be stated, however, that no significant objective evidence of

toxicity to antimony potassium tartrate (a g myocardial damage) was encountered

### DISCUSSION

The incidence (35 per cent) of infestation by *S. mansoni* in our group of Puerto Rican troops compares favorably with that (39 per cent) reported by Linty and his associates\* in a larger series. Similar observations have been recorded by others.\*

It is obvious that our findings were, for the most part, of a protracted, latent, asymptomatic infestation rather than of a clinically apparent or significant disease. This is not construed to mean that the pathologic changes observed in our 15 patients may not, in time progress to a more grave disease. That schistosomal granulomas in the liver may eventually produce frank cirrhosis is well known. One hazard to these individuals, albeit uncommon, is illustrated in the youth found to have multiple granulomatous polyps studding the rectosigmoid mucosa and coexisting with a rectal adenocarcinoma.

Fortunately, the infested Puerto Rican in the continental United States does not constitute an epidemiologic problem in the sense of transmission or spread of the disease. The essential molluscan host (a snail *Australorbis glabratus*) is lacking in this country. On the other hand, for American troops assigned to the tropical areas where the molluscan host abounds, the possibility of infestation by *S. mansoni* exists. That this does not often occur reflects the apparent requisite for protracted exposure over many months or perhaps years.

The diagnosis of infestation can be established exclusively by no single technic. Under the usual circumstances, coprology provides the simplest screening test and will identify about two thirds of infested individuals. This degree of sensitivity has been borne out by others. Rectal biopsy will reveal a similar fraction in the majority; there is overlapping with both positive stools and biopsies. Histologic examination of the rectal mucosa has the advantage of objectively demonstrating the disease as manifested by the granulomatous reaction to embedded ova. The technic by which unstained mucosal fragments may be immediately examined is eminently useful.

Our experience suggests that attempts at treatment with the present armamentarium of the asymptomatic infestation are unwise. Not only does this therapy necessitate a protracted loss of time from duty (and engender an unwarranted anxiety in the patient) but the currently available drugs induce a high incidence of incapacitating side reactions. Further, the long term value of treatment is debatable.

## SUMMARY

Among 43 young, native, Puerto Rican soldiers, slightly more than one third were found to harbor *Schistosoma mansoni* as manifested by ova in the stools or by granulomas in the rectal mucosa and liver. Almost without exception the infestations were latent and asymptomatic. Active treatment of such disease as encountered in this group is not recommended.

## REFERENCES

- 1 Meleney H E. Problems in control of schistosomiasis (Charles Franklin Craig lecture) *Am J Trop Med* 3: 209-218 Mar 1954.
- 2 Haubrich W S and Wells R M. Carcinoma co-existing with Manson's schistosomiasis. *Am J Digest Dis* 2 (New Series) 335-341 June 1957.
- 3 Craig C F and Faust E C. *Clinical Parasitology* 5th edition. Lea & Febiger Philadelphia Pa. 1951 pp 476-477, 486.
- 4 Latty S G Jr, Junter G W, Moon A P, Sullivan B H Jr, Burke J C and Sproat H F. Studies on schistosomiasis: comparison of stool examination, skin test, rectal biopsy and liver biopsy for the detection of schistosomiasis mansoni. *Gastroenterology* 27: 324-333 Sept 1954.
- 5 Pons C A and Reyes F M. Manson's schistosomiasis in Puerto Rican soldiers. *Puerto Rico J Pub Health & Trop Med* 25: 319-323 Mar 1950.
- 6 Weller T H and Dammin G J. Incidence and distribution of *Schistosoma mansoni* and other helminths in Puerto Rico. *Puerto Rico J Pub Health & Trop Med* 21: 125-147 Dec 1945.
- 7 Dimmette R M, Elwi A M and Sproat H F. Relationship of schistosomiasis, polyposis and adenocarcinoma of large intestine. *Am J Clin Path* 26: 266-270 1956.
- 8 Warner B W. Role of proctologist in diagnosis of schistosomiasis by sigmoidoscopy and rectal biopsy. *New York J Med* 56: 3137-3140 Oct 1956.
- 9 Warner B W. Diagnosis of schistosomiasis mansoni by sigmoid and transparency biopsy of rectal mucous membrane. *Am J Surg* 92: 743-747 1956.



toxicity to antimony potassium tartrate (e. g., myocardial damage) was encountered

### DISCUSSION

The incidence (35 per cent) of infestation by *S. mansoni* in our group of Puerto Rican troops compares favorably with that (39 per cent) reported by Latty and his associates in a larger series. Similar observations have been recorded by others.<sup>1,2</sup>

It is obvious that our findings were, for the most part, of a protracted latent asymptomatic infestation rather than of a clinically apparent or significant disease. This is not construed to mean that the pathologic changes observed in our 15 patients may not, in time progress to a more grave disease. That schistosomal granulomas in the liver may eventually produce frank cirrhosis is well known. One hazard to these individuals, albeit uncommon, is illustrated in the youth found to have multiple granulomatous polyps studding the rectosigmoid mucosa and coexisting with a rectal adenocarcinoma.

Fortunately the infested Puerto Rican in the continental United States does not constitute an epidemiologic problem in the sense of transmission or spread of the disease. The essential molluscan host (a snail, *Australorbis glabratus*) is lacking in this country. On the other hand for American troops assigned to the tropical areas where the molluscan host abounds the possibility of infestation by *S. mansoni* exists. That this does not often occur reflects the apparent requisite for protracted exposure over many months or perhaps years.

The diagnosis of infestation can be established exclusively by no single technic. Under the usual circumstances, coprology provides the simplest screening test and will identify about two thirds of infested individuals. This degree of sensitivity has been borne out by others. Rectal biopsy will reveal a similar fraction in the majority; there is overlapping with both positive stools and biopsies. Histologic examination of the rectal mucosa has the advantage of objectively demonstrating the disease as manifested by the granulomatous reaction to embedded ova. The technic by which unstained mucosal fragments may be immediately examined is eminently useful.

Our experience suggests that attempts at treatment with the present armamentarium of the asymptomatic infestation are unwise. Not only does this therapy necessitate a protracted loss of time from duty (and engender an unwarranted anxiety in the patient) but the currently available drugs induce a high incidence of incapacitating side reactions. Further the long term value of treatment is debatable.

## SUMMARY

Among 43 young, native, Puerto Rican soldiers, slightly more than one third were found to harbor *Schistosoma mansoni* as manifested by ova in the stools or by granulomas in the rectal mucosa and liver. Almost without exception the infestations were latent and asymptomatic. Active treatment of such disease as encountered in this group is not recommended.

## REFERENCES

- 1 Meleney H E Problems in control of schistosomiasis (Chastles Franklin Craig lecture) *Am J Trop Med* 3 209-218 Mar 1954
- 2 Haubrich W S and Wells R M Carcinomas co-existing with Manson a schistosomiasis *Am J Digest Dis* 2 (New Series) 335-341 June 1957
- 3 Craig C F and Faust E C *Clinical Parasitology* 5th edition Lea & Febiger Philadelphia Pa. 1951 pp 476-477 486
- 4 Latty S G Jr Junter G W Moon A P Sullivan, B H Jr Burke J C and Sproat H F Studies on schistosomiasis: comparison of stool examination, skin test, rectal biopsy and liver biopsy for the detection of schistosomiasis mansoni *Gastroenterology* 27 324-333 Sept 1954
- 5 Pons C A and Reyes F M Manson a schistosomiasis in Puerto Rican soldiers *Puerto Rico J Pub Health & Trop Med* 23 319-323 Mar 1950
- 6 Weller T H and Dammla G J Incidence and distribution of *Schistosoma mansoni* and other helminths in Puerto Rico *Puerto Rico J Pub Health & Trop Med* 21 125-147 Dec 1945
- 7 Dimmette, R M Flaw A M and Sproat H F Relationship of schistosomiasis to polyposis and adenocarcinoma of large intestine *Am J Clin Path* 26 266-276 Mar 1956
- 8 Warner B W Role of proctologist in diagnosis of schistosomiasis mansoni by sigmoidoscopy and rectal biopsy *New York J Med* 56 3137-3140 Oct 15 1956
- 9 Warner B W Diagnosis of schistosomiasis mansoni by sigmoidoscopy and transpatency biopsy of rectal mucous membrane *Am J Surg* 92 743-747 Nov 1956.



August 1957)



*Figure 1 (case 1) Preoperative roentgenographic appearance of cyst*

Microscopic examination of the cyst fragments showed single and confluent cholesterol clefts surrounded almost completely by giant cells of foreign body type (fig 2). The stroma consisted of dense fibrous tissue containing foci of hemosiderin filled macrophages, a few small thick walled blood vessels and masses of hemoglobin. In one portion around a large cluster of crystals, the stroma was very dense, eosinophilic and acellular. Here the giant cells near the clefts were poorly defined and occasionally were trapped in the acellular stroma. At the periphery of the lesion the fibrous tissue faded into and enclosed bony lamellae. The lamellae showed loss of calcium and had only a few osteoblasts. The peripheral bony lamellae probably represented pre existing but modified cancellous bone. Normal well calcified bone and fatty marrow were encountered peripherally. No keratin scales or remnants of epithelium were present.

At last report, four months after operation the patient was on duty without disability and roentgenograms revealed satisfactory healing.



Figure 2 (case 1) Photomicrograph of bone lesion. Note fibrous stroma and cholesterol clefts ( $\times 85$ )

Case 2. A 24 year old man complained of soreness of the left heel. Roentgenogram revealed a cyst in the os calcis. He returned to duty but his heel again became painful, particularly when he had to stand for a long time. There was no history of injury to the os calcis. Six months after discovery of the cyst he was admitted to the hospital where examination of the left foot disclosed no tenderness, swelling or limitation of motion.

Roentgenograms of the left foot and the findings at operation were strikingly similar to those in case one. The cystic area was thoroughly curetted, washed with absolute alcohol and packed with autogenous iliac bone chips.

Microscopic examination of the curetted fragments showed dense fibrous tissue in which there were numerous cholesterol clefts surrounded by giant cells of foreign body type (fig. 3). In the fibrous stroma there were collections of intact red blood cells, hemoglobin and foci of hemosiderin filled macrophages and fat filled macrophages (figs. 4 and 5). The lesion was well circumscribed but not encapsulated. At the periphery there was a rather abrupt change to normal fatty marrow and bony lamellae and a few areas of osteoid tissue. Some of the clefts were surrounded on one side by giant cells of foreign body type, on the other by hemoglobin and a few intact red blood cells. It appeared that as the red cells were lysed they released cholesterol which probably established the foreign body reaction and as hemo-



Figure 3 (case 2) Photomicrograph of bone lesion  
Similar to figure 2 ( $\times 85$ )



Figure 4 (case 2) Photomicrograph shows cholesterol  
clefts surrounded by foreign body giant cells and a  
central collection of hemosiderin-filled macrophages  
( $\times 85$ )



Figure 5 (case 2) High power view of section in figure 4 ( $\times 170$ )

siderin was formed from hemosiderin it was phagocytosed by the macrophages. Inflammatory reaction was absent and there was no evidence of keratin scales.

Examination one month after operation disclosed a full range of motion of the left foot and no pain on weight bearing. Six months later roentgenograms revealed nearly complete healing with incorporation of the bone chips into the architecture of the os calcis.

**Case 3.** A 21-year-old man complained of pain in the left ankle. Three days before while playing basketball he had turned his left ankle forcing the foot into extreme flexion and abduction. After the injury he had pain, tenderness, and swelling along the fifth metatarsal bone and just anterior to the lateral malleolus. Extreme inversion of the foot was painful.

A roentgenogram of the left foot revealed no evidence of recent injury but disclosed a cyst of the os calcis that had the same appearance as those in cases one and two (fig. 6). At operation the cyst was similar to that in case one and was treated in the same manner. Microscopically the lesion was similar to those in the previous two cases (fig. 7).

Five months after operation the patient was discharged to duty free of symptoms. A roentgenogram at that time showed excellent



Figure 6 (case 3) Preoperative roentgenographic appearance of cyst



Figure 7 (case 3) Photomicrograph in a fibrous tissue. The cell fades into normal tissue





Figure 8 (case 3) Appearance of lesion 5 months after operation demonstrating excellent healing



Figure 9 (case 3) Appearance of lesion 3 years after operation showing almost complete healing

August 1957)

## CYSTS OF THE CALCANEUS

healing of the cyst (fig 8) and one three years later (fig 9) almost complete healing (fig 9)

Case 4. A 23 year old man was seen one year after a severe virus twist of the left ankle while playing basketball. Injury was followed immediately by pain and swelling of the ankle and he had considerable difficulty in walking. Three years later the patient had jumped off a 10-foot wall landing on his left heel. There was immediate sharp pain and swelling in the heel that lasted for 2 days. Following this injury and until the present injury, the heel was painful and the ankle swelled after long hikes.

On examination the left ankle was swollen and the lateral side of the joint was tender. Roentgenograms of the ankle (fig 10) showed



Figure 10 (case 4) Pre-operative roentgenographic appearance



Figure 8 (case 3) Appearance of lesion 5 months after operation demonstrating excellent healing



Figure 9 (case 3) Appearance of lesion 3 years after operation showing almost complete healing

## DISCUSSION

The following discussion is based on our 4 cases of cysts of the os calcis and 22 cases from the literature<sup>1-15</sup> (table 1)

TABLE 1 Location symptoms role of trauma and treatment in 26 cases of cyst of os calcis

	Cases in literature <sup>1-15</sup> (22)	Cases in present series (4)
Location		
Right os calcis	6	—
Left os calcis	9	4
Not stated	7	—
Symptoms		
Pain	9	1
None	13	3
History of trauma		
Remote	4	—
Recent	7	3
None	11	1
Treatment		
Curettage	1	—
Curettage and rongeurium	2	—
Curettage and bone chips	8	4
No operation	7	—
Not stated	4	—

**Age of Patient** The youngest patient was 8 years of age and the oldest, 53. The number of patients according to decades was as follows: first decade, 1, second decade, 5, third decade, 12, fourth decade, 3, fifth decade, 2, and sixth decade, 1. In two instances the age of the patient was not stated.

**Clinical Findings** Often there were no symptoms referable to the cyst. In 3 of our cases, in 4 of Fitte and Mulerhy's<sup>3</sup> cases, and in Pujol Diaz and Autorino's<sup>11</sup> case, the patients sustained a sprain of the ankle or foot, and a cyst in the os calcis was discovered incidentally when a roentgenogram was taken to determine the extent of the injury. Pain in the heel, which in many instances was aggravated by walking, was a prominent symptom in our cases 2 and 4, and in the cases of Coues,<sup>1</sup> Smith,<sup>2</sup> Caritat,<sup>4</sup> Ravelli,<sup>15</sup> and Verstandig.<sup>11</sup> McLachlin's<sup>7</sup> patient was an 8 year old girl who had a painful limp of 1 year's duration. Seven years after operation, she had slight pain in the foot only after walking long distances.

Some of the patients gave a history of trauma. In our case 4, the patient complained of pain in the heel after jumping from a 10 foot wall. For the following 3 years the patient noted that his left heel became painful and swelled after long marches. The cyst was not discovered until he sprained

his ankle Smith's<sup>2</sup> patient fell from a ladder Coues' patient fell on his right heel, and a cyst was found incidentally in the left os calcis Pavolli's patient was a 31 year old German soldier who jumped from a height of 12 feet, with the result that his foot was swollen for 6 weeks, and painful for 6 months Thereafter, he had no disability and was able to march long distances Six years after the injury, a cyst of the os calcis was found incidentally by roentgenography It should be emphasized that trauma may antedate the discovery of the cyst by months or years

Fitte and Mulcahy's case 1 was a 32 year old man bitten by a snake below the external malleolus The area was cauterized with a hot iron and a scar formed Ten years later, the patient sprained his ankle and roentgenography revealed a typical cyst of the os calcis under the scar There is probably no relationship between the cyst and the snake bite

The caso described by Pujo-Diaz and Autorino was unique in that the cyst was located in the large tuberosity of the calcaneous The patient had fallen from a ladder 10 years prior to operation and had sustained a sprain of the left ankle He was unable to walk because of pain in the calcaneus

Physical findings were of little aid in diagnosis In several of the cases there was tenderness of the external malleolus, or at a point just below and anterior to the external malleolus

**Roentgenographic Findings** In all but 1 of the 22 cases reported in the literature and in all of our cases, the cysts were located in the antero-inferior and lateral regions of the os calcis The cysts were oval, round or somewhat triangular in shape with the base directed inferiorly The margins were smooth well defined, and in most instances surrounded by a border of sclerotic bone All the cysts were solitary and unicameral Ridges of bone on the inner surface of the cyst appeared as trabeculations in the roentgenograms and gave a false impression of multiloculation The cortex was not expanded, but was thin over the lateral and inferior aspects of the cysts

The reason advanced for the location of the cysts in the subastragal portion of the os calcis is that in this area there is normally an area of rarefaction Thus, Fitte and Mulcahy mentioned that in their experience the cysts were located anteriorly, between the body and the large apophysis, at a point in the os calcis where there normally exists an area of rarefaction of the osseous trabeculae which correspond to the lines of force Ravelli described this area as *Neutral Raum* (neutral room), or *Fersenbeindreieck* (triangle of the os calcis) and Caritat, as *un punto debil* Surry<sup>3</sup> studied this triangle of rarefaction in 1200 roentgenograms of the normal foot and found

the rarefaction to be marked in 7.1 per cent, moderate in 22.1 per cent, and slight in 70.8 per cent. Brailsford<sup>17</sup> stated that an area of triapular osteoporosis is sometimes seen in the os calcis, that it varies in size, definition and contrast, and that it does not represent an active lesion. In his figure 175A, he illustrates such an area which does not differ roentgenographically from our 4 cases of bone cysts and those reported in the literature. As emphasized by Stuelke,<sup>18</sup> it is difficult to determine in many instances if one is dealing with a bone cyst of the os calcis or with an exaggerated area of normal rarefaction.

Brailsford's<sup>17</sup> figure 176 is a roentgenogram of a cyst, which encompassed nearly the entire os calcis, and had an area of osteosclerosis at its posterior margin. This cyst was the largest described in all the published cases.

Pujo-Diaz and Autorino's case is unique in that the cyst was located in the tuberosity of the calcaneus.

**Operative Findings.** In all our cases, when the cysts were opened at operation, a fluid escaped that was clear or slightly turbid, yellow, and occasionally serosanguineous. The walls of the invariably unicameral cysts were smooth, and showed bony ridges. The cysts, in addition to the fluid, contained a small amount of soft yellow brown tissue filling from 20 to 40 per cent of the cavity. Occasionally bony spicules could be palpated in the tissue. In our case 4 the tissue showed red hemorrhagic areas. Both Ravelli's case 2 and Cristol's case had fragments of sclerotic bone free in the cavity. No discolorable lining was present on gross inspection in our cases.

**Pathology.** The microscopic appearance of the lesions in our cases was that of fibrosis, old and recent hemorrhage, hemosiderin deposition, and numerous cholesterol clefts surrounded by foreign body giant cells. In 2 of our cases the deposition of cholesterol crystals was a prominent feature. In previously published cases of cyst of the os calcis, cholesterol was mentioned only in the case described by Brailsford. Caplan, Viooli, and Crumrine's figure 1 of case 2, also a cyst appearing to be a cholesterol cleft surrounded by foreign body giant cells. Cholesterol in cysts of bone other than of the os calcis has been described. Thus Latta and Lichtenstein<sup>19</sup> noted cholesterol crystals in 2 of 18 cases of bone cysts. In one of their cases the material consisted of cholesterol crystals embedded in fibrin, and in the other case the tissue included cholesterol crystals, foam cells, hemorrhage filled macrophages, and foreign body giant cells. Latta and Lichtenstein<sup>19</sup> mentioned that large quantities of cholesterol crystals are often present in the tissue spaces of bone cysts. Wilson<sup>20</sup> has also mentioned in a few cases of bone cysts the presence of cholesterol crystals. The large cholesterol crystals in the tissue spaces of the bone cysts in our cases are similar to those described by Latta and Lichtenstein<sup>19</sup> and Wilson.<sup>20</sup>

believe represent pre existing bony lamellae which underwent decalcification and resorption and not newly formed bone

Child<sup>21</sup> recently reported a lipoma of the os calcis, a roentgenogram of which was similar in all respects to the roentgenograms in our cases and in the cases previously reported in the literature. We had the opportunity of examining the sections in Child's case (AFIP Acc No 687100) and noted adipose tissue containing cholesterol clefts but no areas of hemorrhage. His case resembles our case & in many respects. In the third reported case of lipoma of long bones by Nielson and associates<sup>22</sup> cholesterol clefts were absent and the cyst contained only adipose tissue. We suggest that Child was dealing with a cyst of the os calcis rather than a lipoma of bone.

**Pathogenesis** We believe that the pathogenesis of cysts of the os calcis is as follows: (1) fracture secondary to trauma within the cancellous portion of the os calcis at a point of weakness (2) hemorrhage (3) intrasosseous pressure as a result of a hematoma with resultant lysis of bone and the formation of a cyst, (4) reactive bone formation to form a zone of sclerosis around the cyst (5) organization of the hematoma with retraction of tissue to form a remnant of fibrous tissue on the wall of the cyst (6) transudation of a bloody or xanthochromic fluid into the cavity.

It is known that intracancellous fracture may occur with minimal trauma. Mullinger<sup>23</sup> described "insufficiency fracture" of the os calcis similar to "march fracture" of the metatarsals. In Mullinger's cases the fractures were mainly in the posterior part of the os calcis and could not be demonstrated by roentgenography until the healing stage when a linear area of dense bone could be seen at the site or sites of fracture.

On microscopic examination of the remnants of tissue within the cysts there was clear cut evidence of organizing hematoma in the form of fibrous tissue which contained hemosiderin granules, foam cells and cholesterol. Cholesterol crystals are a frequent accompaniment of hemorrhage particularly when the adjacent tissue is poor in resorptive capabilities. For example, cholesterol crystals are frequently found in intraocular hemorrhage—a situation in which lymphatics are lacking. Ayres and Haymaker<sup>24</sup> also noted massive deposition of cholesterol crystals following hemorrhage into the choroid plexus of the brain, where lymphatics are likewise lacking. The cholesterol is probably derived from the blood plasma and from the stroma of red blood cells.

The thought that bone cysts are secondary to hemorrhage is by no means new. Beneke<sup>25</sup> in 1904 expressed the opinion that bone cysts were the result of intracancellous fracture which disturbed intrasosseous pressure relationships and these to-

gether with the poor resorptive properties of bone, caused the formation of a cyst. According to Pommer,<sup>24</sup> massive bleeding into bone, serous exudation into a hematoma with increased pressure, and occlusion of venous return may give rise to the formation of a cyst. Pommer also made the important observation, that if the cortex is fractured, a bone cyst does not develop, because the pressure within the hematoma is relieved through the break in the cortex. Copleman and associates advanced the view that bone cysts of the os calcis represented a dysplasia following multiple episodes of minor trauma. Numerous authors have reported traumatic bone cysts in the jaws.<sup>25-27</sup>

Alterations in blood cholesterol is probably not of etiologic significance, inasmuch as the total blood cholesterol and cholesterol esters were within normal limits in 3 of our 4 patients.

Another possibility is that the cysts are secondary to an epidermal cyst of the os calcis, a type of cyst that also contains cholesterol crystals. This possibility can be readily ruled out, however, since epidermal cysts have a squamous epithelial lining and invariably contain keratin, a substance notoriously difficult to mobilize in tissues. In none of our cases and those described in the literature was there evidence of an epidermal cyst.

There was no suggestion of a hemorrhagic diathesis in our four patients, all tests were negative in one of our patients who was completely studied in this regard. The bone lesions in cases of hemophilia do not represent true bone cysts. Ghormley and Clegg<sup>28</sup> described hemophilic pseudotumors of bone in which there were tumors of soft parts and often subperiosteal hemorrhage with extensive bone formation and destruction. These findings are far different from those in cyst of the os calcis.

**Treatment.** The treatment of choice is curettage of the cyst wall and packing with bone chips. Operation had not been performed on some of the cases previously published because the cysts were asymptomatic or because the physicians believed that the cystic area was an exaggeration of the normal triangular area of osteoporosis. We saw two other patients at the U. S. Naval Hospital, Yokosuka, Japan, which were not operated on, because the cysts were asymptomatic. Copleman, Vidoli, and Crimmings treated 2 of their cases by curettage and rongeur of the ridges of bone within the cyst. They stated that bone chips may be placed within the cavity at operation but, are not necessary to effect a cure.

#### SUMMARY AND CONCLUSIONS

Although we have been able to find only 22 cases of cyst of the os calcis in the literature, this lesion probably occurs more frequently than the number of reported cases would indicate.



We have seen 6 patients with such cysts in the last nine years (4 of which are reported in this article) and there are 13 recorded at the Armed Forces Institute of Pathology

These cysts have considerable military significance, in that they may be expected to occur in active young men undergoing rigorous physical activity during military training. There often is no history of antecedent or remote trauma. Symptoms may be absent, or there may be pain in the heel. The diagnostic roentgenographic appearance is that of a well defined, trabeculated, unicameral, solitary cyst in the lateroinferior portion of the anterior half of the os calcis. At operation a yellow fluid escapes, revealing a cyst that is partially filled with a soft yellow brown tissue. Histologically, this tissue shows organizing hemorrhage, often associated with massive deposition of cholesterol crystals. The treatment of choice is curettage and packing with bone chips. This results in a cure within four months, in most instances.

We believe that the cyst is caused by hemorrhage into the bone, secondary to traumatic intraosseous fracture.

**ACKNOWLEDGMENT** We wish to thank Helen Knight Steward of the Armed Forces Institute of Pathology for editorial assistance and Dr Philip Guarino for assistance in translating articles from the foreign literature.

#### REFERENCES

1. Coues W P. Cyst of bone cyst of os calcis. *Boston M & S J* 170: 611 Apr 16 1914
2. Smith N R. Cyst of os calcis. *J Bone & Joint Surg* 12: 416 Apr 1930
3. Sobel A. Kyste osseux du calcaneus. *Besv. ch. un enfant d 15 a.* *att. int. d. osteomyelite*. *Bull. et mem. Soc. de med. de France* 24: 849-85 Dec 1936
4. B. Ite M H. Cited in reference 3
5. Furr M J and Mulcahy J. Fomaci e quiste d calcis. *Bol. y trab. Soc. de chir. de Buenos Aires* 23: 705-711 Aug 23 1939
6. Caillat R J. Forme nesquiste d calcis. *Arch. trav. de med. chir. y especialid.* 18: 41-47 Jan 1941
7. McLaughlin A D. Treatment and results in localized osteitis fibrosa cystica (solitary bone cyst). *J Bone & Joint Surg* 25: 777-790 Oct 1943
8. Jaffe H. Localized bone cyst of calcis. *J Bone & Joint Surg* 28: 182 Jan 1946
9. Clement B, Vidoli M F and Cramming F J. Solitary cyst of calcis. *Rad. ology* 47: 142-148 Aug 1946
10. de Sao Thiago P. Enxosto osseo (apostostoma osseo). *Rev. bras. de chir.* 16: 295-310 May 1947
11. Vratzky C C. Solitary unicameral cyst of os calcis. *New England J Med* 237: 21-22 July 3 1947
12. Hundley J M (Mphs. Tenn.). Solitary bone cyst of os calcis (form of osteitis fibrosa). *J Arkansas M. Soc.* 45: 7-8 June 1948
13. Pardo-Diaz J M and Autino C. Quiste solitario de calcis. *Prensa med. argentina* 38: 1232-1233 May 18 1951
14. Schin H R, Bench W E, Friedl E and Uhlger E. Roentgen D. *agnostics*. Grune & Stratton Inc. New York N Y 1955. Vol 2. Skeletal (Part 2) p 8-6
15. Rethi A. Das Ferschenbein. *Chir. St. von Hamatomysten*. *B. str. Klin. Chir.* 186: 36-43 1953

16. Sippy A Pseudo-cystic abscess in normal os calcis *Acta Radiol* 31 531-532  
Dec 1951
17. Brailsford J F *The Radiology of Bones and Joints* 5th edition, Williams  
& Wilkins Co Baltimore Md 1953 pp 182-183
18. Stucke F *Der Ferseenschmerz Funktionelle und organische Störungen im  
Bereich der Ferse und Achillessehne* Georg Thieme Verlag (Wien) Germany  
1956 p 123
19. Jaffe H L and Liebenstein L Solitary osteocartil bone cyst with emphasis  
on roentgen picture pathologic appearance and pathogenesis *Arch Surg* 44 1004  
1925 June 1942
20. Lasthaus M Jugendliche Knochenzyste und Unfall *Chirurg* 21 677-679  
Dec 1950
21. Child P L Lipoma of os calcis report of case *Am J Clin Path* 25 1050-  
1052 Sept 1955
22. Dickson, A B Ayres W W Mason M W and Miller W R Lipoma of bone  
of intra-osseous origin *J Bone & Joint Surg* 33 A 257-259 Jan 1951
23. Mullinger C W Insufficiency fracture of calcaneus similar to march fracture  
of metatarsal *J Bone & Joint Surg* 26 751-757 July 1944
24. Ayres W W and Haymaker W Xanthoma and cholesterol granuloma of chondroid  
plexus report of 30 cases and review of literature To be published
25. Beneke Discussion of article by Mönckebete Über Cystenbildung bei Osteitis  
fibrosa *Verh. deutsch. path. Ges* 7 Heft 1 240-241 1904
26. Pommer G Zur Kenntnis der progressiven Hämation und Phlegmasiveränderungen  
der Röhrenknochen auf Grund der mikroskopischen Befunde Heft 1 im neuen Knochen-  
enzystenatlas II v Haberer *Arch f Orthop u Unfall-Chir* 17 17-69, 1919
27. Bennett I B and Chilton A W Traumatic cysts of mandible report of case  
*J Am Dent A* 32 51-59, Jan 1945
28. Blum T Do all cysts in jaws originate from dental system (with report of  
2 non-dental cysts lined with ciliated columnar epithelium). *J Am Dent A* 16, 647-  
661 Apr 1929
29. Blum T Unusual bone cavities in mandible report of three cases of traumatic  
bone cysts *J Am Dent A* 19 281-301 Feb 1932
30. Havens F Z and Dix C R Benign cysts of jaws *Proc Staff Meet, Mayo  
Clin* 15 305-308 May 15 1940.
31. House L R Benign cysts of superior maxilla with special reference to cysts  
of maxillary sinus clinicopathologic study of 30 cases *Arch Otolaryng* 48 310-326,  
Sept 1948.
32. Ivy, R H and Curtis L Hemorrhagic or traumatic cysts of mandible *Surg  
Gynec & Obst* 65 640-642 Nov 1937
33. Lazansky J P Wuchmann, A H and Glickman J Traumatic cyst of mandible  
*Am J Orthodontics (Oral Surg Sect)* 32 155-159 Mar 1946
34. Olech E Sicher H Weissmann J P Traumatic mandibular bone cysts *Oral  
Surg* 4 1160-1172 Sept 1951
35. Robinson R A Traumatic hemorrhagic cyst of mandible in an infant *J Am  
Dent A* 32 774-775 June 1945
36. Ruabton M A Solitary bone cysts in mandible *Brit Dent J* 81 37-49 July  
1946
37. Smith C J and Barrows A A Traumatic cyst in mandible case report.  
*Internat J Orthodontia*, 23 748-750 July 1917
38. Ghormley R K. and Clegg R S Bone and joint changes in hemophilia  
with report of cases of so-called hemophilic pseudotumor *J Bone & Joint Surg*  
30-A 589-600 July 1948.

## DELUSIONS OF GRANDEUR

A PHYSICIAN recently remarked that he had been living in a pink cloud. He worked long hours, gave his family a little of his company at mealtimes, let his secretary keep the books and pay the bills periodically, while he kept drifting with the cloud.

There are several errors in this schedule not the least of which is absence of a schedule. In the first place, when a physician starts practice, he should ask himself what he wants out of life and map a course accordingly. If he wants only money, he can work many hours longer than the accepted 40 a week, adopt sound if not ruthless business methods, and keep in close personal touch with his finances. If he wants solely to work and there are patients available, he can extend himself night and day from humanitarian motives, because of restlessness, or just hustle around for the exercise. Most of us are constantly attempting to combine several of these issues by effecting a compromise of one sort or another.

These compromises involve many factors: the first being an inventory of assets in regard to education, training, personal fitness, and expectancy of life. A likable fellow, even if only halfway accomplished medically but with a knack for making money, can build a tidy estate. But there is neither economy nor sense to spending \$30,000 or more for an M.D. (cost plus what could be earned those school years) and upwards of 10 years in classroom and hospital then working 16 hours a day, seven days a week, only to die prematurely from a coronary. Somewhere there should be a compromise which will allow the physician to refuse patients care if it conflicts with the conduct of a safe sane and longer life.

The pink cloud is a delusion in which most physicians revel when they quote income (to themselves or others). This quoting is more frequently practiced by intimation or giving the appearance of affluence.

The fellow who does \$30,000 worth of work a year and gives the public the impression he is making \$30,000 a year is going to pay taxes all along the line for what he has done for himself or his estate. Hospitals and other charities will clamor for handouts. His family will eat and dress at \$30,000 standards and

---

Reprinted with permission from *Massachusetts Physician*, v 15, No. 9, pp. 175-176, and 178, May 1957.

his children will go to expensive schools. Sometimes his wife, who should protect him for her own social security, if for no other reason, will urge him on to work harder because of pride, envy, vanity, or her own sloth.

Of course, doing \$30,000 worth of business doesn't at all mean having \$30,000 to live on. To do \$30,000 worth of work a year, a physician would have to charge an average of \$15 per hour for a 40-hour week for 50 weeks a year, theoretically. To budge these figures very much would mean taking liberties with published statistics of reasonable accuracy, or it would mean working longer hours more days. This in turn exacts its toll of wear and tear on the physician's physique, and deprives him of normal family life, time to pursue avocations, and to indulge those pursuits that make for a well rounded normal citizen of his particular social status. Without these considerations he does not compromise but is compromised.

### BIG BUSINESS

The delusion may show itself in boasting, keeping up with Dr. Jones, or in many trifling ways, but \$30,000 worth of work, particularly if it is made by house calls and office visits, gives the impression of big business. Percentages of collections, however, (amount of money taken in per year in relation to the value of the work done in that year) vary from season to season and from year to year from 50% to 95%, with few exceptions. Over a 25 year period, it is not likely to exceed 90%. This gives a cash income of \$27,000 or less. Depending upon the physician's type of practice and mode of living, his operating expenses can be safely estimated to run not less than 40%. Sixty per cent of \$27,000, then, or \$16,200 represents take home pay before taxes.

From this figure one should deduct the expenses that a physician has over and above those of the ordinary worker, whose taxes are deducted from his pay before he gets it, and whose way of life is geared to actual cash in hand, and not to a paper mirage. This amount is impossible to pin point, but if it includes federal and state taxes, special insurance costs, and a grab bag called noblesse oblige, it would not likely be less than \$5,000. The net comparable earnings for the physician who does \$30,000 worth of work would then be close to \$10,000-\$12,000. The rub comes when the pastor expects church support to be on a \$30,000 level. The rub comes when the hospital thinks the doctor is loaded. The rub comes when the physician wishes to retire or has to, and there has been too little put aside comparable to the other fellow's social security.

Somewhere in the accounting one has to reckon with work done for which no charge is made. This work adds to the fatigue

## DELUSIONS OF GRANDEUR

A PHYSICIAN recently remarked that he had been living in a pink cloud. He worked long hours, gave his family a little of his company at mealtimes, let his secretary keep the books and pay the bills periodically, while he kept drifting with the cloud.

There are several errors in this schedule not the least of which is absence of a schedule. In the first place, when a physician starts practice he should ask himself what he wants out of life and map a course accordingly. If he wants only money, he can work many hours longer than the accepted 40 a week, adopt sound if not ruthless business methods and keep in close personal touch with his finances. If he wants solely to work and there are patients available he can extend himself night and day from humanitarian motives because of restlessness or just hustle around for the exercise. Not of us are constantly attempting to combine several of these issues by effecting a compromise of one sort or another.

These compromises involve many factors, the first being an inventory of assets in regard to education, training, personality, fitness and expectancy of life. A likable fellow, even if only halfway accomplished medically, out with a knack for making money, can build a tidy estate. But there is neither economy nor sense to spending \$30,000 or more for an MD (cost plus what could be earned those school years) and upwards of 10 years in classroom and hospital then working 16 hours a day seven days a week only to die prematurely from a coronary. Somewhere there should be a compromise which will allow the physician to refuse patients care if it conflicts with the conduct of a safe, sane, and longer life.

The pink cloud is a delusion in which most physicians revel when they quote income (to themselves or others). This quoting is more frequently practiced by intimation or giving the appearance of affluence.

The fellow who does \$30,000 worth of work a year and gives the public the impression he is making \$30,000 a year is going to pay ~~sassy~~ all along the line for what he has done for himself or his estate. Hospitals and other charities will clamor for handouts. His family will eat and dress at \$30,000 standards, and

---

Reprinted with permission from *Massachusetts Physician*, vol. 15 No. 9 pp. 175, 176, and 178, May 1957.

# TERMINAL CARCINOMA OF THE BREAST

## Palliative Therapy With Depo Testosterone

CARL G PETERSON Jr *Captain USAF (MC)*

**T**ESTOSTERONE cyclopentylpropionate (TCP) has been found to be twice as effective as testosterone propionate (TP) in anabolic potency over a comparable period of time<sup>1</sup> TCP is also effective for a longer period TP for 72 hours, and TCP for 2 weeks<sup>2</sup> In order to compare the effectiveness, dangers, side effects, and convenience of these two forms of testosterone in the treatment of carcinoma of the breast, 12 patients were treated with Depo Testosterone Cyclopentylpropionate (brand of testosterone cyclopentylpropionate) The results were compared with those in King's<sup>3</sup> series of 18 patients treated with testosterone propionate

### METHOD

Five hundred milligrams of TCP intramuscularly once every month was arbitrarily chosen as the dosage in this series Hypercalcemia is a danger when giving any form of testosterone to a patient with bone metastases<sup>4</sup> Therefore, such patients were given TP initially so that if they did develop hypercalcemia, the drug could be stopped immediately and its effect would be exhausted within 72 hours This initial course of TP, amounting usually to 250 mg every other day for 10 days, was given in the hospital where the serum calcium level could be determined frequently Each patient was also placed on a low calcium diet beginning a few days prior to initiation of therapy If the patient did well, as they all did, then TCP was used in subsequent therapy Patients with no bone metastases were treated with TCP from the beginning

A low sodium diet, beginning two to three days before the start of therapy and continuing throughout, was prescribed to prevent or minimize fluid retention, observed at times as generalized edema formation<sup>5</sup> and at other times as pleural effusion<sup>6</sup>

---

From U S Air Force Hospital Sheppard Air Force Base Tex Capt Peterson is now assigned to Harbor General Hospital Torrance Calif

of the day and the weariness of the years, and include medical attention to one's family, close friends, professional brethren and miscellaneous others. Few keep figures on these items but it has been estimated at \$3 000-\$5 000 per year. If this is so, the so-called \$30 000 a year man might be worked at the rate of \$35 000.

The physician who works to the tune of \$35 000 who thinks and spends in terms of \$30 000 but actually lives on \$10,000 is deluded indeed.

---

#### MUST WE ALWAYS TREAT THE PATIENT?

When in therapeutic doubt—and in our present state of knowledge that must be often—we readily yield to the fallacious maxim something must be done. Why do we yield so readily? One reason is that in all of us there lurks a power complex—a desire to dominate our fellow men—to order their uprisings and their downittings. Presented with the issue to do or not to do we are hopelessly biased toward action. The defense so often professed that the patient demands action has something to it but at the same time we make little attempt to educate the public in this respect."

—W MELVILLE ARNOTT M D  
in *Lancet*  
p 183 Oct 15 1955

Although the use of a cauterizing agent on plantar warts involves repeated weelly application, it has the virtue of permitting the patient to remain ambulatory and productive. We use bichloroacetic acid. Some favor the use of electrodesiccation, a modality which demands particular care that the operator minimize loss of normal tissue. Because of the relatively greater danger of permanent disability, the use of roentgen ray therapy and surgical excision has been infrequent in our practice. Many ineffective forms of injection therapy have been described. Despite their present drawbacks, the eventual development of a specific agent would seem likely.

The use of 10 to 25 per cent podophyllin in tincture of benzoin has become the treatment of choice for condylomata acuminata. In extensive lesions, initial treatment is confined to small areas. Widespread inflammation may follow excessive application, particularly when lesions are treated in the urethra, vagina, or anus. The patient should be advised to bathe the treated area after 4 to 12 hours, depending on his response to a trial application.

### SUMMARY

Fewer than 10 dermatoses constitute about three quarters of the dermatologic conditions commonly encountered in either a military or civilian clinic, and the relative frequency of occurrence in military and civilian patients is roughly parallel. A brief review is presented of the diagnosis and treatment of those conditions most frequently seen at military sick call.

### REFERENCES

- 1 Goodman H. Statistics of 10 most common skin diseases based on analysis of 973 090 published cases. *Arch. Dermat. & Syph.* 20: 186-188 Aug 1929.
- 2 Sohrweide A W. Recent changes in dermatologic diagnosis: resume of 1 112 050 published cases. *Arch. Dermat. & Syph.* 30: 260-263 Aug 1934.
- 3 Sulzberger M B and Baer R L. Some common misconceptions regarding dermatology. In *The Year Book of Dermatology and Syphilology* 1947. The Year Book Publishers Inc. Chicago Ill. 1947 pp 5-32.
- 4 Fox E C and Shields T L. Resume of skin diseases most commonly seen in general practice. *J. A. M. A.* 140: 763-768 July 2 1949.
- 5 Gilman R L. Incidence of skin diseases in student health service. *Am. J. M. Sc.* 168: 268-270 Aug 1934.
- 6 Andrews G C, Domonkos A N and Post C F. Treatment of acne vulgaris. *J. A. M. A.* 146: 1107-1113 July 21 1951.
- 7 Cronk G A, Naumann D E, Heitzman E J, Matty F N, McDermott K J and Vercillo A A. Tetracycline hydrochloride in treatment of acne vulgaris. *A. M. A. Arch. Dermat.* 73: 228-235 Mar 1956.
- 8 Baer R L and Witten V H. Selected aspects of dermatologic therapy with superficial x ray and Grenz rays. In *The Year Book of Dermatology and Syphilology* 1955-1956. The Year Book Publishers Inc. Chicago Ill. 1956. pp 7-36.
- 9 Strauss J S and Kligman A M. Acne observations on dermabrasion and anatomy of acne pit. *A. M. A. Arch. Dermat.* 74: 397-404 Oct 1956.
- 10 Eyster W H, Roth G M and Kierland R R. Studies on peripheral vascular physiology of patients with atopic dermatitis. *J. Invest. Dermat.* 18: 37-46 Jan. 1952.



of the day and the weariness of the years and includes medical attention to one's family close friends professional brethren, and miscellaneous others. Few keep figures on these items but it has been estimated at \$3 000-\$5 000 per year. If this is so the so-called \$30 000 a year man might be worked at the rate of \$35 000.

The physician who works to the tune of \$35 000 who thur's and spends in terms of \$30 000 but actually lives on \$10 000 is deluded indeed.

---

### MUST WE ALWAYS TREAT THE PATIENT?

When in therapeutic doubt—and in our present state of knowledge that must be often—we readily yield to the fallacious maxim something must be done. Why do we yield so readily? One reason is that in all of us there lurks a power complex a desire to dominate our fellow men to order their uprisings and their downittings. Presented with the issue to do or not to do we are hopelessly biased toward action. The defense so often professed that the patient demands action has something to it but at the same time we make little attempt to educate the public in this respect.

—W. MELVILLE ARNOTT M. D.  
in *Lancet*  
p. 783 Oct 15 1955

friction, pressure, moisture, and circulatory response are seldom, if ever, reduplicated

Treatment involves daily unroofing of the vesicles and bulla with complete evacuation of the contents, in addition to the measures outlined above

Chronic scaling ringworm of the feet may spread to the ankles and legs. Often a focus is present in the nails. The hands, wrists, and forearms may be involved, but rarely the trunk. Reactions often are so low grade that the patient considers them "natural dryness" of the skin. Usually such processes are caused by *T. rubrum*. The diagnosis ordinarily is made with ease on microscopic examination of the KOH preparation. If the culture demonstrates *T. rubrum*, the prognosis becomes extremely bleak. Involvement of the nails assures a source of reinfection unless controlled. We use a dental bur to thin the nail to the point of pain, and instruct the patient to thin them daily, using an emery board or knife blade after soaking the nails for half an hour with 20 per cent KOH. The nails are coated with nail polish when dry. This necessarily tedious management of a local, irritant but nondisabling infection has little appeal to patients, other than those whose concern is primarily cosmetic.

Avulsion of the nail is performed if a distorted nail is causing soft tissue damage, but is otherwise noncurative. The uniform presence of spores elsewhere in soft keratin often results in reinfection of the new nail.

Management of the skin involves manual desquamation, when feasible, and the use of ointments. Gradual progression to double strength Whitfield's ointment or 10 per cent salicylic acid may be necessary.

**Dermatophytids.** Allergic eruptions of the hands and feet ("ids") often mimic vesiculobullous types, particularly *T. mentagrophytes* infections, and absolute differentiation cannot always be certain. The presence of hyperhidrosis of the hands in the absence of mycelial elements favors the diagnosis of an "id," particularly if the palms and inner aspects of the fingers are involved.

Like all forms of allergy, "ids," constitute an acquired specific alteration in the capacity to react, mediated through an antigen-antibody immunologic phenomenon. It is not surprising then that the responses of the skin to fungal elements or their products are multiple, nor that any area of the skin surface may be involved. In addition to the vesicular forms, "ids" may be morbilliform, papular, or erythematous. The latter may resemble crysipelas, erythema multiforme, or erythema nodosum. The diagnosis should be one of exclusion, in all but vesicular types. Treatment parallels that of vesicular tinea pedis.

## COMMON DERMATOSES

Aug 1 1957)

or soaks followed by 3 per cent Vioform lotion may have to precede the use of fungistatic agents. Ointments are applied only at night. Lotions and emulsions are used during the day until the patient is graduated to a powder. Desenex (brand of zinc undecate) being one of the most practical nocturnal itching may become one of the most difficult of therapeutic problems, and the use of Eurax (brand of crotamiton) or Tronothane (brand of pramoxine hydrochloride) may be indicated in the presence of eczematous response. hydrocortisone ointment should be instituted.

**Tinea Pedis** Inflammations of the feet are among the commonest of diseases observed at sick call. In many but by no means all of these fungi are present however they may contribute little to the disability. The incidence of true dermatophytosis is high, largely because of the tendency to chronicity and recurrence among susceptible races. This circumstance, which often borders on the near hopeless occasionally breeds an attitude of indifference that changes to concern only when cellulitis and lymphangitis supervene.

The most common inflammation of the foot is seen in intertriginous areas at the base of the toes. Many of these are desquimating and self limited, requiring no treatment if they can be kept dry or the toes separated. Often the bacterial element must first be abolished, and this may be the simplest aspect of therapy. Because most antifungal agents are relatively ineffective other suitable measures also must be used. Debridement and drainage may require exposure to the air along with rest. Suitable soaks are followed by 3 per cent Vioform lotion or a bland fungistatic emulsion, and elevation in hot and humid environments, the patient with hyperhidrosis may have dry foot only when an electric fan is available. Slippers are worn when ambulation is first effected. Local therapy being restricted to emulsion type vehicles. Ointments may be used at night when the patient is fully ambulated but powder is used during the day. As porous a shoe as is possible with a leather sole, is necessary. The patient is advised that his participation in athletic events involving the use of a rubber soled shoe may be followed by recurrence.

**Vesiculobullous tinea pedis** usually is caused by *T. men tagrophytes* or *Epidermophyton floccosum*. Often the entire sole and the nails may be involved. Since the process may be a sensitization reaction, fungi are not always demonstrable, nor need they be when the diagnosis is obvious. Repetitive involvement of the dorsa suggests contact dermatitis despite consistent demonstration of fungi, and the patient must be patch tested to the components of his shoes. The patches should be read after 2, 4, and 7 days before rejecting the possibility of allergic sensitization. Such a test is not absolute, as the factors of heat,

Return for check ups at each *scheduled visit* Preceding this shampoo the scalp thoroughly but do not apply the medication

6 If inflammation of the scalp occurs, make an early appointment Some degree of inflammatory reaction of the affected areas occurs frequently and is probably not an indication for discontinuing treatment

7 In some resistant cases, progress is slow Do not become discouraged when results are not effected within 8 to 16 weeks

**Tinea Barboe** Most inflammatory conditions of the bearded area are pyoderma Ringworm of the beard may be seen among men who work with animals, however, and may assume clinical types similar to those of tinea capitis A kerion of the bearded area is usually caused by *T mentagrophytes* or *Trichophyton verrucosum*, and the treatment parallels that of scalp involvement Spontaneous remission usually occurs in two or three months Follicular types, with pustulation and crust formation, progress to fracture of the hair or its extrusion These forms are characteristically prolonged, as are most infections with *Trichophyton rubrum* and *Trichophyton violaceum* Superficial circinate lesions, which may occur outside heavily bearded areas, usually respond readily to fungistatic or keratolytic ointments

**Tinea Corporis** Ringworm of the glabrous skin is often seen in patients exposed to the disease in other persons or in animals Predisposing circumstances may be a hot, humid environment, poor personal hygiene, or a debilitating condition A number of morphologic variants exist, in addition to the circinate type that has a bull's eye appearance because of healing in the center Most of these are self limited and relatively noninfectious Some trichophytions cause lesions that do not heal in the center, and zoophilic species produce many forms that tend toward chronicity These may resemble granulomas, nummular eczema, vesicular dermatoses, or if plaques occur, psoriasis or seborrhea These often are caused by *T rubrum*, which also may produce granulomatous folliculitis and perifolliculitis

**Tinea Cruris** This is a chronic, intertriginous infection that may spread to the inguinal and perineal regions, the intergluteal sulcus, or the buttocks The appearance of the lesion varies with the organism, the location, and the tendency to miliaria and sweat retention It is influenced by temperature, friction, obesity, and local susceptibility to irritants and sensitizers The lesions usually are brownish or red, and maculopapular Scaling occurs only when the process extends away from the folds, if so, the edges are usually well demarcated It is from these sites that the diagnosis is most easily established, because the scaly border readily demonstrates filaments

Treatment is carried out in accordance with the acuteness of the lesion and the presence of secondary infection Sitz baths

## COMMON DERMATOSES

East 1957

clinical appearance varies according to geographical location the course usually is of only two to four months duration

Tinea capitis caused by *T. men-atropica* is uncommon except in farmers who have domestic animals and the kerion is not distinctive Spread to the scalp from lesions elsewhere is most uncommon

In the southwestern areas of the United States tinea capitis caused by *T. tonsurans* has become a public health threat. It is spread among family members and intimates and the morphology is variable Patches often are indistinct and angular and may contain "black dots" that are the fractured ends of involved hairs characteristically buried in a scaling mantle Chronicity over a period of many years is a distinct possibility although kerion development carries a good prognosis Because of the frequently nondescript character the disease often masquerades as and is treated for other scalp conditions

The antifungal ointments commonly used in treating tinea capitis help to confine the infection but will destroy only ear face pores Although roentgen ray epilation cures practically all cases its use usually is confined to treatment of *T. tonsurans* and *T. tonsurans* infections after the disease has been allowed to stabilize over a three- to four-month period This may be delayed somewhat longer with girls Epilation is usually unnecessary in *M. canis* and *T. men-atropica*'s infection but if performed, a six-month period of stabilization is necessary

The treatment of tinea capitis is facilitated by the use of printed instructions

## Ringworm of the Scalp

Your child has a contagious disease caused by a fungus like organism. The affected hairs become dull and brittle and break off near the roots often leaving bald spots Because the disease is contagious all other children in the family should be examined The following directions should be followed carefully and fully

1 Have the hair of boys cut very short taking precautions to catch the clippings which should be destroyed preferably by burning Papers may be placed over the shoulders back and chest and on the floor to catch the hair The shears on the cutting head of clippers should be sterilized by boiling in water for 15 minutes are use

2 Rub the ointment on the affected areas every morning and in the evening scalp every night It must be rubbed in well

3 Wash the scalp once or twice each week using a d. e. gen. shampoo

4 The child must use only his own comb and brush and must wear a clean stocking cap or disposable paper cap at all times If stocking caps are used they may be cleansed by boiling for 15 minutes

This is a chronic, mycotic infection of the hair in an upper follicle. It has a world wide distribution and frequently occurs in epidemics, being spread from person to person by animals and by fomites, particularly clothing and barber's instruments. It probably is spread by the cushions of theater seats and similar objects in crowded places, when personal hygiene is poor. It is five to ten times more common in boys than girls. The disease usually is caused by one of four fungi, each of which provokes a reasonably distinct clinical picture. The onset is insidious, with slight itching. Involved hairs, which are enveloped by spores, are dull and lusterless and project from a papule that varies in the degree of inflammatory reaction. Eventually, most of the hairs break and areas of partial baldness occur. The baldness usually is temporary.

Confirmation of a presumptive diagnosis of tinea capitis is made by study of the hair with a Wood's light, by microscopic examination, and by culture. Hairs infected with *Microsporum audouinii* and *Microsporum canis* have a characteristic, brilliant blue green fluorescence under Wood's light. Other infections show only faint fluorescence or a dead white appearance.

Microscopic examination of a KOH preparation of the hair will demonstrate small spores that appear to be on the periphery of the hair sheath (ectothrix) in *M. audouinii* and *M. canis* infections. The spores of *Trichophyton mentagrophytes* also are ectothrix in location, but are extremely large. Those of *Trichophyton tonsurans* are large, but appear to be confined within the hair (endothrix). If infected hairs are planted on Sabouraud's glucose agar slants, the characteristic cultural appearance and microscopic morphology aids in establishing the diagnosis.

The lesions of the scalp in full blown *M. audouinii* infections are usually superficial, circinate, multiple, gray patches with little evidence of inflammation. Characteristically the disease is chronic and refractory, lasting well over three months, with infrequent spontaneous involution. In some sections of the country, the course has been described as inflammatory from the outset, with coalescent folliculopustules, forming a boggy infiltrate (kerion) from which hairs are extruded. Apparently this course is incident to allergic sensitization. Despite the severity and chronicity of the condition, the appearance of a kerion is a favorable sign, usually antedating involution and rarely leading to permanent alopecia.

*M. canis* infections run a relatively short course, since a kerion almost always develops. The disease is usually acquired from other children or animals. Kittens are common transmitters, as the fungi may be confined to a few of their peripheral hairs and detectable only by a Wood's light. Here again, although the

clinical appearance varies according to geographical location the course usually is of only two to four months' duration

Tinea capitis caused by *T. mentagrophytes* is uncommon except in farmers who have domestic animals and the kerion is not distinctive. Spread to the scalp from lesions elsewhere is most uncommon.

In the southwestern areas of the United States, tinea capitis caused by *T. tonsurans* has become a public health threat. It is spread among family members and intimates, and the morphology is variable. Patches often are indistinct and angular and may contain "black dots" that are the fractured ends of involved hairs, characteristically buried in a scaling mantle. Chronicity over a period of many years is a distinct possibility, although kerion development carries a good prognosis. Because of the frequently nondescript character the disease often masquerades as, and is treated for other scalp conditions.

The antifungal ointments commonly used in treating tinea capitis help to confine the infection, but will destroy only surface spores.<sup>11</sup> Although roentgen ray epilation cures practically all cases its use usually is confined to treatment of *M. audouinii* and *T. tonsurans* infections after the disease has been allowed to stabilize over a three to four month period. This may be delayed somewhat longer with girls. Epilation is usually unnecessary in *M. canis* and *T. mentagrophytes* infection but if performed, a six months' period of stabilization is necessary.

The treatment of tinea capitis is facilitated by the use of printed instructions.

#### Ringworm of the Scalp

Your child has a contagious disease caused by a fungus like organism. The affected hairs become dull and brittle and break off near the roots, often leaving bald spots. Because the disease is contagious all other children in the family should be examined. The following directions should be followed carefully and faithfully.

1. Have the hair of boys cut very short, taking precautions to catch the clippings which should be destroyed preferably by burning. Papers may be placed over the shoulders, back and chest and on the floor to catch the hair. The shears or the cutting head of clippers should be sterilized by boiling in water for 15 minutes after use.

2. Rub the ointment into the affected areas every morning and into the entire scalp every night. It must be rubbed in well.

3. Wash the scalp once or twice each week using a detergent shampoo.

4. The child must use only his own comb and brush and must wear a clean stocking cap or disposable paper cap at all times. If stocking caps are used, they may be cleansed by boiling for 15 minutes.

**Tinea Capitis** This is a chronic, mycotic infection of the hair shaft and upper follicle. It has a world wide distribution and frequently occurs in epidemics, being spread from person to person by animals and by fomites, particularly clothing and barber's instruments. It probably is spread by the cushions of theater seats and similar objects in crowded places, when personal hygiene is poor. It is five to ten times more common in boys than girls. The disease usually is caused by one of four fungi, each of which provokes a reasonably distinct clinical picture. The onset is insidious, with slight itching. Involved hairs, which are enveloped by spores, are dull and lusterless and project from a papule that varies in the degree of inflammatory reaction. Eventually, most of the hairs break and areas of partial baldness occur. The baldness usually is temporary.

Confirmation of a presumptive diagnosis of tinea capitis is made by study of the hair with a Wood's light, by microscopic examination, and by culture. Hairs infected with *Microsporum audouinii* and *Microsporum canis* have a characteristic, brilliant blue green fluorescence under Wood's light. Other infections show only faint fluorescence or a dead white appearance.

Microscopic examination of a KOH preparation of the hair will demonstrate small spores that appear to be on the periphery of the hair sheath (ectothrix) in *M. audouinii* and *M. canis* infections. The spores of *Trichophyton mentagrophytes* also are ectothrix in location, but are extremely large. Those of *Trichophyton tonsurans* are large, but appear to be confined within the hair (endothrix). If infected hairs are planted on Sabouraud's glucose agar slants, the characteristic cultural appearance and microscopic morphology aids in establishing the diagnosis.

The lesions of the scalp in full blown *M. audouinii* infections are usually superficial, circinate, multiple, gray patches with little evidence of inflammation. Characteristically the disease is chronic and refractory, lasting well over three months, with infrequent spontaneous involution. In some sections of the country, the course has been described as inflammatory from the outset, with coriaceous folliculo-pustules, forming a boggy infiltrate (kerion) from which hairs are extruded. Apparently this course is incident to allergic sensitization. Despite the severity and chronicity of the condition, the appearance of a kerion is a favorable sign, usually antedating involution and rarely leading to permanent alopecia.

*M. canis* infections run a relatively short course, since a kerion almost always develops. The disease is usually acquired from other children or animals. Kittens are common transmitters, as the fungi may be confined to a few of their peripheral hairs and detectable only by a Wood's light. Here again, although the



which may include species of *Candida* (information often useful in treatment and prognosis) one must culture the specimen. This also is a simple procedure. It involves the use of Sabouraud's glucose agar slants at room temperature. Final identification is made on the basis of the characteristics of the colony cultured and its microscopic morphology. By transferring a portion of the colony to a drop of any wetting agent on a slide, teasing it into fragments, then staining with Gram's stain or "cotton blue" its characteristics are clarified. The species identification is described in all texts of elementary mycology.

These texts also will present a discussion of the common contaminants the occasional presence of which may be the most disappointing and limiting feature of this otherwise engaging investigation. All equipment necessary for a final diagnosis can be found on the supply table of the Medical Department. If the dispensary or clinic does not possess an autoclave, an inexpensive pressure cooker will sterilize the medium in 15 minutes at 15 pounds pressure.<sup>11</sup> The tubes or bottles can then be allowed to cool "on a slant" and if refrigerated will be satisfactory for weeks.

The diagnosis of *tinea versicolor* and *tinea capitis* is facilitated by the Wood's light, which uses a nickel chloride filter to eliminate all the rays but ultraviolet from a beam of light. In *tinea versicolor* there is a yellowish tan fluorescence in certain other fungal infections there is a brilliant greenish-yellow or a greenish gray fluorescence. The presence or absence of fluorescence is of great practical benefit in diagnosis and management.

**Tinea Versicolor.** The most superficial common mycosis is *tinea versicolor*, which is characterized by the asymptomatic and chronic course of tan colored desquamating macules usually involving or spreading to the chest, back, shoulders, and neck. The diagnosis is readily apparent except when other portions of the body are involved or the rash becomes follicular in appearance. Because it is so trivial and noncontagious by nature, it is usually disregarded by the patient. He may present himself after acquiring a sun tan because the areas of involvement remain relatively depigmented. The presence of mycelia and spores of varying sizes, on direct microscopic examination, establishes the diagnosis. Culture is not only unnecessary but unsatisfactory. Whereas some patients will be satisfied with reassurance, others will require some form of treatment. All forms of treatment are unsatisfactory, inasmuch as most infections recur, but any fungicide is temporarily effective. Twenty-five per cent sodium thiosulfate lotion applied twice daily is one of the most effective, simple, and least objectionable preparations available. Recently, selenium sulfide preparations have been used with encouraging results.<sup>12, 13</sup>

Local therapy is influenced by the fact that the skin of the lower legs is exceedingly susceptible to sensitization reactions. Only bland wet dressings, lotions, or ointments with low sensitizing index are used. The use of Gelfoam (brand of water-insoluble gelatin base) powder or sponge<sup>24</sup> has been one of the greatest recent advances in therapy.

Sponge rubber also may be placed over ulcers and supported with elastic dressings or an Unna boot, in order to maintain steady even pressure. Inasmuch as many of the organisms of infected cases are anaerobes, culture and sensitivity studies may be helpful. Antibiotics may have to be supplemented by zinc peroxide paste or Vioform. When inflammation and weeping subside, lubricants or tar and hydrocortisone may be used. Following epithelization, Ace bandages or elastic stockings may be indispensable.

The patients should be evaluated by surgeons experienced in vascular physiology. Despite painstaking study, a decision to carry out a surgical procedure on the superficial veins, including multiple ligation and stripping, may prove to be without benefit if deep and feeder veins are incompetent.

#### FUNGAL INFECTIONS

The ringworm fungi (dermatophytes) are ubiquitous, world wide in distribution, and infect both man and animals. The forms carried by the latter are usually transient in man, tending toward spontaneous cure. Because natural resistance is high in the general population, the acquisition of a fungal infection involves unique susceptibility combined with special circumstances.<sup>25</sup> The presence of the disease in members of the same family constitutes the exception rather than the rule, and the average person can be infected artificially with great difficulty, if at all. Since the organisms are common soil saprophytes and are present in great numbers in barracks, dormitories, and shower rooms, such prophylaxis as is commonly practiced usually is inadequate and doomed to failure.

Any diagnosis of a superficial fungal infection based solely on clinical grounds may be wrong as often as right. On the other hand, the establishment of conclusive proof is one of the simplest procedures in laboratory diagnosis,<sup>26-28</sup> and it is unfortunate that it has fallen into such general disuse. One has only to immerse involved hair or a scraping of the skin or nails in 15 per cent potassium hydroxide (KOH) on a glass slide, to establish the diagnosis microscopically. This may be facilitated by adding equal parts of Parker "51" fountain pen ink<sup>29</sup> to the KOH, or heating thick specimens until "clear." The presence of branching septate hyphal fragments in the skin or nails or the presence of spores on the hairs can be determined by any novice. This will confirm the diagnosis, but to determine the genus,

## COMMON DERMATOSES

A. Gust 1957)

**Chronic Eczematous Dermatitis** This condition frequently originates in an area of contact or irritant dermatitis following which secondary factors lead to and perpetuate inflammatory changes. Morphologically any form of dermatitis may be seen and the lesions may be single or multiple without preference as to site or distribution. Inasmuch as the most constant feature is the tendency to recur at previously involved sites seemingly without provocation and to develop exacerbations during therapy previously regarded as adequate, this is often one of the most tantalizing conditions in dermatology.

Once the pattern of dermatitis has been set secondary factors may assume principal roles contributing to chronicity. The patient's sensitivity to topical application is increased and flare ups may defy the blandest of therapy. The effect of trauma, prosuro, sweating, infection or irritation may be magnified, and it may be necessary to discontinue even oral medication. The use of new preparations often must be limited initially to small trial areas. As cross group sensitization has become common, the patient must be warned to suppress an inclination to depart on independent courses of self medication.

The treatment of this entity is similar to that outlined for atopic dermatitis. Because of the cyclic nature of the disease conclusions as to etiology and effects of therapy must be arrived at cautiously and impartially. In patients with tendencies to hypochondriasis degeneration of the doctor-patient relationship into pointless and unproductive detailed discussions of the diet may be avoided by a temporary elimination of those foods that have been incriminated in past experience. Those might include milk, cheese, chocolate, tomatoes, citrus fruits, coffee, shellfish and nuts.

**Stasis Dermatitis** This dermatitis usually occurs about the ankles, but if neglected the inflammation extends, edema increases, and the signs of eczema appear. Cellulitis, recurrent phlebitis, lymphangitis, ulceration, pigmentation and lymphedema presage an irreversible state. Varicose veins comprise the fundamental pathology, and as 75 per cent of varices occur before 30 years of age in 10 to 17 per cent of the population, all medical officers must be prepared to recognize and treat the entity early. It is commonly seen in those who have a familial predisposition and who spend much time "on their feet." Regardless of cause, the derangement in physiology leads to interference with peripheral vascular circulation. Our primary aim is to combat the element of stasis by use of elastic stockings or bandages or by elevation of the extremity for indicated periods. Uninterrupted decompensation leads to extravascular escape of cells and protein, with development of a brawny fibrosis and hemosiderosis.

tropic dysfunction, and many forms of endocrine imbalance, particularly diabetes

In the simple forms, the condition is easily recognizable by excessive oiliness, often with greasy scaling of the scalp or extension to the lids, ears, nasolabial folds, and sternum. With the development of pyogenic superinfection and involvement of the flexures and intertriginous areas of the glabrous skin, the diagnosis may be difficult. This is especially true in the chronic form presenting disseminated and confluent plaques, which may become exfoliative and intractable. Treatment for seborrhea capitis with 3 per cent resorcinol alcohol and detergent shampoos is usually sufficient. Selenium sulfide may be helpful, supplemented by 3 per cent sulfur salicylic ointment, or in advanced cases by compound coal tar ointment. When the lids, ears, or intertriginous areas are involved, the degree of inflammation will indicate the management. Antibiotic lotions, or hydrocortisone with or without 0.5 per cent selenium sulfide, may simplify the therapy.<sup>15</sup> Otitis externa, when chronic, is treated in conjunction with an otologist, who can aid in debridement and promoting dryness of the external auditory canal.

**Nummular Eczema** As the name indicates, nummular eczema is characterized by well demarcated elevated erythematous coin-shaped plaques containing vesicles. The lesions are usually multiple, commonly appearing on the hands, feet, extremities, back, or buttocks. Despite a typical morphology, the patient may not be atopic, and the appearance of nummular eczema after the age of 30, when the eczema of most atopics has subsided, makes it a puzzling entity. Furthermore, a history of contact dermatitis may not be forthcoming, although the lesions may occasionally occur in showers in patients with other forms of dermatitis in whom local or systemic medication of high sensitizing index has been used. That the areas constitute a point of lowered resistance is evidenced by repeated recurrence at sites previously involved. Another fairly consistent finding of some consequence is the presence of coagulase positive micrococci. The significance of this fact has not been established, but these commonly torpid infections must be contrasted with the condition known as infectious eczematoid dermatitis.<sup>16</sup> This syndrome occurs when the appearance of infectious exudate precedes the development of plaques of vesicles or pustules in contiguous areas, often followed by the development of similar lesions at distant sites.

A search for precipitating factors must be diligent and complete.<sup>17-24</sup> Foci of infection, drugs, and ingestants have been incriminated, and their abolition often leads to relief. Symptomatic and general therapy involves correction of dryness, avoidance of irritants, the use of antibacterial agents, and the general measures described above.

as inexpensively as possible and ointments containing tar, salicylic acid, or sulfur used as indicated. Local infection may be controlled with Vioform (brand of iodochlorhydroxyquinin) or antibiotic ointments.

Mixtures of the above with or without hydrocortisone<sup>12</sup> may repay the increased costs involved. Since exacerbations may be triggered by unknown factors, a recurrence that intervenes during therapy of a type usually considered efficacious often demoralizes the patient and he must be prepared emotionally for this eventuality.

Ultra-violet ray therapy often leads to involution, as may roentgen ray therapy. The transient and uncertain benefits and the hazards of the latter must be carefully evaluated, and a proper place assigned to it in the long range plan of therapy.

Superficial psychotherapy in conjunction with tranquilizing drugs may offer much to the patient, whereas extensive discussions with psychiatrists, regardless of their competence, may serve only to vitiate our other efforts. The rapport necessary in the management of the condition usually obviates any indecision in this respect.

In atopic dermatitis in infancy there may be marked variation in the localization of the lesions. Usually the face is involved but areas of varying size may appear at any site. Much of the disease is incident to scratching, and our first efforts at therapy are aimed at prevention of irritation. All surfaces in contact with the skin should be smooth, the clothing should be non-abrasive, and the hands should be kept from the skin by mechanical means. Irritating soaps, detergents and local radiation are temporarily discontinued.

If a flare up of atopic dermatitis is observed to follow introduction of a certain food<sup>13</sup> into the diet, its use should be suspended temporarily. Traditionally, milk, eggs, and wheat have been said to be causative, though incontrovertible evidence for this assumption in the individual case may be elusive.

If one of the many available food substitutes is used, the principles of adequate nutrition must be maintained. The use of antihistaminic therapy is usually effective and well tolerated. If home care is unavailing, the child may have to be hospitalized, and in certain selected cases systemic corticosteroid therapy may be necessary.

**Seborrheic Dermatitis.** This disease is not always included in the eczema group, although many of the features of eczema may be evident. Primarily, it is a disease of excessive sebaceous gland activity and is commonly localized to areas of high sebaceous gland concentration. It may appear in association with acne vulgaris, rosacea, psoriasis, Parkinson's disease,<sup>14</sup> neuro

formity in the nomenclature of this disease had its origin in vagueness of diagnostic criteria. The fundamental pathology of eczema is well known, and although the etiology may remain somewhat obscure, the clinical signs, protean though they may be, are fairly clear cut. They occur in approximately the following sequence, but may regress at any point: (1) inflammation, (2) vesicle or bulla formation, often with serous exudate and crusting, (3) thickening of the skin, sometimes with papule formation, (4) petechial development and hyperpigmentation, and (5) excoriation and lichenification incident to scratching.

**Atopic Dermatitis.** This condition often appears in infancy, but tends to disappear at any age thereafter up to 30 years. The lesions are commonly located on the face and neck, antecubital and popliteal areas, hands, wrists, and ankles, although any site may be involved in exacerbations. Lichen chronicus simplex usually occurs on the face, neck, wrists, and legs, thighs, legs, and occiput—regions that are readily accessible to the patient in moments of concentration or of frustration. Often there are areas of chronic localized infection, particularly in the intertriginous tissues. Sweat retention is common, as are manifestations of vasomotor instability.<sup>10</sup> Pruritus is marked and may occur in waves, precipitating periods of uncontrolled scratching and excoriation.

There usually is a family history of allergy, hay fever, vasomotor rhinitis, urticaria, asthma, or migraine, the classical background of the atopic. Treatment is often prolonged and dissatisfying to patient and physician alike, and must be conducted in an atmosphere of mutual understanding and loyalty. A careful history is necessary, particularly to determine the efficacy of previous therapy and to avoid medication objectionable to the patient. Broad principles should be stressed repeatedly, especially the avoidance of physical and emotional stress<sup>11</sup> and of outright precipitating factors often well known to the patient but ignored during flights of irresponsibility.

Inasmuch as skin testing ordinarily discloses a multiplicity of sensitivities, such an evaluation, if used as a guide in management, is probably best left to the dermatologist.

General antiallergic measures are essential. The skin is highly susceptible to primary irritants, and chemical and physical insult, including that caused by soap, must be avoided. Gloves of cotton, with or without rubber, may be necessary. Rough clothing, which includes most material exclusive of cotton, may have to be discontinued, together with chafing, binding, or restricting garments.

The early management may require colloid baths, or soothing, bland, and antipruritic lotions. The skin should be lubricated

## COMMON DERMATOSES

A. J. AUST (1957)

Patients are instructed in the use of a loop blackhead extractor and advised to return to the clinic for management of stubborn comedones, frankly pustular lesions, cysts and coalescent areas.

It is our practice to fortify local therapy with cleansing by a naphtha or detergent soap once or twice daily to emulsify the oil and soften the keratin plug. This single procedure may be the most important local measure. We advise application of White Lotion N F IX at night which is removed in the morning. If this is inadequate, addition of a standard acne day lotion may help. The patient may prefer to use tinted proprietary preparations, many of which contain sulfur or resorcinol. Since seborrhea commonly is present, we advise the use of a 3 per cent resorcinol alcohol preparation of the scalp at bedtime. The scalp must be shampooed twice weekly.

The use of broad spectrum antibiotics to control the pustular phase has been observed to yield benefits that may be out of proportion to the apparent effect on the infection. The local use of soap containing hexachlorophene or lotions with neomycin bacitracin should be considered.

Acne is thought to be the result of physiologic hormonal changes, and the routine use of estrogens is inadvisable. Girls whose acne flares up prior to the menstrual period may profit by use of estrogens in the first half of the cycle. Thyroid extract is used only when clear cut evidence of hypothyroidism exists.

Natural sunlight is often beneficial if the atmosphere is not too hot and humid, although occasionally it may cause exacerbations. During the winter months the use of artificial ultraviolet light may be substituted.

The use of carbon dioxide slush or other peeling methods is best reserved for the dermatologist.

If the above measures do not control sebaceous activity, fractional doses of roentgen rays may be used over a period of 7 to 10 weeks.

Once the disease has been controlled, deep pits and protruberant scars may be smoothed somewhat by dermabrasion with a high speed rotary brush or bur.

Tropical acne, occupational acne, acneiform eruption due to drugs, acne with excoriations and acne rosacea do not fall within the scope of this discussion.

## ECZEMA

Acute and chronic dermatitis (eczema) constitutes over 25 per cent of our clinical dermatology. Much of the lack of uni-

local trauma, heredity, stress and fatigue, intestinal dysfunction, and sometimes of ingestion of fatty food, iodides, and bromides

The necessity of beginning therapy early cannot be emphasized too strongly, as psychic trauma, though often unsuspected, may be profound. Not only will the course of the disease be shortened, but the sequelae minimized. Characteristically, acne vulgaris subsides spontaneously at about 16 years of age. This fact should offer no deterrent to therapeutic effort, as the condition may persist for years or undergo recrudescence in tropical climates or at the menopause.

TABLE 1 *The 10 most common dermatoses in order of frequency as noted by various observers and as seen in this hospital*

Sulzberger and Baer <sup>3</sup> (Private practice)	Fox and Shields <sup>4</sup> (Private practice)	Gilman <sup>5</sup> (University students)	U S Naval Hospital Philadelphia Pa
Acne vulgaris	Acne vulgaris	Epidermophytosis	Acne vulgaris
Eczemas	Seborrhea	Acne vulgaris	Verrucas
Seborrhea	Epidermophytosis	Seborrhea	Chronic eczematous dermatoses
Epidermophytosis	Eczema	Verrucas	Epidermophytosis
Pruritus	Dermatitis venenata	Pyoderma	Pyoderma
Urticaria	Impetigo	Dermatitis venenata	Seborrhea
Atopic dermatitis	Scabies	Eczema	Atopic dermatitis
Drug eruptions	Urticaria	Pityriasis rosea	Nummular eczema
Psoriasis	Psoriasis	Moles	Pityriasis rosea
Lichen chronicus simplex	Pityriasis rosea	Herpes zoster	Psoriasis

The standard diet in military service usually affords ample amounts of the nutritious foods necessary in the management of the disease. If practicable, it is desirable to place the patient on a low fat, low iodine diet, which restricts intake of chocolate, cocoa, nuts, fried, fatty, greasy, or creamed foods, gravies, rich pastries or other desserts, shell fish, and iodized salt.

Since most service patients cannot select their diet, we avoid giving them lists of forbidden foods that might lead to undue caloric restriction. We do give them printed sheets explaining the nature of the disease and its treatment. It may be well to supplement the diet with vitamins, particularly A and D, in patients with keratinous follicles. A discussion of the diet affords an opportunity to correct many common misconceptions, to offer restrained reassurance, and to create an atmosphere of confidence by means of an optimistic, understanding attitude.



# THE COMMON DERMATOSES

DALE B WATKINS *Commander MC USA*

IT HAS BEEN observed that the 10 most common skin diseases represent approximately 75 per cent of all the dermatoses. The reports by Goodman<sup>1</sup> and Sohrweide<sup>2</sup> of statistical studies on more than a million dermatologic diagnoses showed that 6 diseases constituted about half of the total. Eight entities accounted for two thirds 1200 consecutive cases seen in the outpatient clinic of this hospital during the fall and winter of 1956. Although the numerical frequency of some dermatologic conditions has varied somewhat during the past 25 years according to the material available for study, changing diagnostic impressions, and other factors, our findings correlate extremely well as is shown in table 1.

This brief review will present the broader aspects of those dermatoses most commonly seen in military practice such as acne vulgaris, verruca vulgaris, epidermophytosis, and the eczemas. In the latter classification several entities are included that usually are discussed separately. The principles of management of the pyodermas are well known and will not be discussed in this article.

## ACNE VULGARIS

Acne vulgaris is observed so frequently in adolescents and in some older individuals as to excite little interest when seen in its milder forms. It occurs most often on the head, shoulders, and back, which are areas where sebaceous glands are numerous and where their activity is increased in nearly all cases. The first sign is commonly an area of inflammation about a keratinous comedo that has obstructed a sebaceous gland or hair follicle. When the force of the expanding comedo ruptures the wall of the follicle, sebum and keratin cause a foreign body reaction which often becomes infected. This may occur in oily skin in pre-adolescents, or at age 13 or 14 when papules and pustules commonly appear. These may become confluent or nodules and cysts may develop.

Variations in the course of acne may be a reflection of hormonal influences, secondary or focal bacterial infection,

(brand of papain) or of 0.13 gram of crystalline papain in 300 ml of a warm, aqueous solution of Zephiran Chloride (brand of benzalkonium chloride) was safe and effective when used as an enema.

**ACKNOWLEDGMENT** The authors wish to thank the following companies for providing the materials listed for use in this investigation: Lederle Laboratories Division, American Cyanamid Company, Pearl River, N. Y. for the Varidase, Enzyme 7 1162-A13; Enzyme 7 1162 A15 and Enzyme 7 1162 D11; Sharp and Dohme, West Point, Pa. for the pancreatic dornase; The Armour Laboratories, Armour and Company, Chicago, Ill. for the Tryptar and Chymar; The American Ferment Company, Incorporated, New York, N. Y. for the Caroid; Winthrop-Stearns, Incorporated, New York, N. Y. for the crystalline papain and crystalline chymopapain; and Wyeth, Incorporated, Philadelphia, Pa., for the Wadase.

#### REFERENCES

- 1 Hawk, P. B., Oser, B. L., and Summerson, W. H. *Practical Physiological Chemistry*, 13th edition, Blakiston Co., New York, N. Y., 1954, p. 446.
- 2 Hwang, K., and Ivy, A. C. Review of literature on potential therapeutic significance of papain. *Ann. New York Acad. Sc.* 54: 161-207, May 16, 1951.
- 3 Wittmack, H. Fermentative action of juice of fruit of *Carica Papaya*. *Pharm. J.* 9: 449-450, Nov. 30, 1878.
- 4 Kilmer, F. B. Story of papaw. *Am. J. Pharm.* 73: 272-285, June 1901; 73: 336-348, July 1901; and 73: 383-395, Aug. 1901.
- 5 Meyer, K., Hahnel, E., and Steinberg, A. Lysozyme of plant origin. *J. Biol. Chem.* 163: 733-740, June 1946.
- 6 Balls, A. K., and Lineweaver, H. Isolation and properties of crystalline papain. *J. Biol. Chem.* 130: 669-686, Oct. 1939.
- 7 Jansen, E. F., and Balls, A. K. In Letters to Editors section. Chymopapain, new crystalline proteinase from papaya latex. *J. Biol. Chem.* 137: 459-460, Jan. 1941.

#### MEETING OF MILITARY

#### OPHTHALMOLOGISTS AND OTOLARYNGOLOGISTS

The Society of Military Ophthalmologists and the Society of Military Otolaryngologists will hold their annual joint dinner meeting during the meeting of the American Academy of Ophthalmology and Otolaryngology in Chicago on 13 October. All members, on active duty or retired, are invited to attend. Reservations may be made at the time of registration for the Academy convention. Other information may be obtained from Major Stanley H. Bear, 3810th U. S. Air Force Hospital, Maxwell Air Force Base, Ala.

Caroid an impure type of papain has been reported to contain a number of enzymes. The proteolytic activities of papain have received most of the attention in the literature<sup>2</sup> however crude papain has been noted to have in addition a milk clotting factor<sup>3</sup> a lipase an amylase, and a lysozyme<sup>4</sup>. Crystalline papain contains a proteolytic enzyme and a milk clotting factor<sup>4</sup>. Crystalline chymopapain has a milk clotting factor equal in amount to that of crystalline papain but contains only half as much proteolytic enzyme as is found in crystalline papain<sup>7</sup>.

Clinical trials were made on 12 patients with impacted feces in whom enemas of water, mineral oil, or other substances had been used without success. The patients were given enemas of either 5.0 grams of Caroid or 0.13 gram of crystalline papain in 300 ml of a warm, aqueous solution of 1:5,000 Zephiran Chloride. In 10 of the 12 patients a bowel movement followed the retention of one of these enemas for 1 hour. In debilitated or weak patients the gluteal regions were brought together with strips of adhesive tape to prevent leakage of the fluid. In none of the patients was there clinical evidence of irritation of the rectum such as pain, tenesmus, tenderness, blood in the stools, or subsequent constipation or diarrhea. The following case reports are examples of the use of enemas containing an enzyme.

#### CASE REPORTS

**Case 1.** A 32-year-old white man with injury of the brain had a fecal impaction. Enemas of water followed by mineral oil which were given hourly for 5 hours were unsuccessful. A large hard stool was passed about one hour after the administration of an enema containing 5.0 grams of Caroid in 300 ml of a warm aqueous solution of Zephiran Chloride.

**Case 2.** A 66-year-old white man had an intestinal obstruction caused by a carcinoma of the descending colon. The ileocecal valve was not competent. A Miller Abbott tube was started. Two enemas of water and two of mineral oil were given without the passage of gas or feces. The administration of a fifth enema of 0.13 gram of crystalline papain in 300 ml of a warm aqueous solution of Zephiran Chloride resulted in the passage of a hard plug of feces measuring about 0.5 cm by 2.0 cm along with large amounts of flatus and liquid fecal material. The plug was soft at the periphery and it was assumed that the stool had occluded the narrowed lumen. The resultant decompression of the colon allowed time for passage of the Miller Abbott tube into the ileum and for restoration of the hemoglobin and electrolytes of the blood before a colostomy in the right part of the transverse colon was done.

#### SUMMARY

The results of the digestion of impacted feces by various enzymes have been reported. A solution of 5.0 grams of Caroid

paected variety (table 1) The solution of hydrogen peroxide exploded the fecal mass, but large quantities of gas were produced, and this could harm the patient Caroid (brand of papain), crystalline papain, crystalline chymopapain, Wydase (brand of hyaluronidase), and an aqueous solution of Zephiran Chloride (brand of benzalkonium chloride) were the only agents that softened or fragmented the feces in 24 hours The activity of the agents was in the order listed Combinations of the agents were made Caroid and Wydase in an aqueous solution of Zephiran Chloride, and crystalline papain and Wydase in an aqueous solution of Zephiran Chloride were superior, in that order, to other combinations, but the effect was only slightly increased by including Wydase in either combination

TABLE 1 Effectiveness in softening or fragmenting 2 gram portions of scybulous feces within 24 hours of adding various agents in 5 ml of solvent

Effective in order listed

Caroid (brand of papain) 1 0 gram in physiologic saline

Crystalline papain 0 13 gram in physiologic saline

Crystalline chymopapain 0 13 gram in physiologic saline

Wydase (brand of hyaluronidase), 150 turbidity reducing units in physiologic saline

Zephiran Chloride (brand of benzalkonium chloride) 1 1000 aqueous solution

Effective but with excessive production of gas

3 0 per cent hydrogen peroxide 2 5 ml in 2 5 ml of Phospho-Soda (brand of sodium biphosphate and phosphate)

Not effective

Water

Mineral oil

Glycerin

Varidase (brand of kinase and nuclease) streptokinase 100 000 units and streptodornase 25 000 units in physiologic saline

Lederle Enzyme 7-1162 A13 1 000 000 proteolytic units in physiologic saline

Lederle Enzyme 7 1162 A15 250,000 proteolytic units, in physiologic saline

Lederle Enzyme 7 1162 D11 1 250 000 proteolytic units, in physiologic saline

Pancreatic domase, 100 000 units, in physiologic saline

Trypsin (brand of trypsin) 0 25 gram in Sorenson's phosphate buffer solution

Chymar (brand of chymotrypsin) 0 1 gram, in physiologic saline

# TREATMENT OF IMPACTION OF FECES WITH AN ENEMA CONTAINING AN ENZYME

GEORGE C GODFREY M. D.  
JOSEPH W MILLER M. D.

**T**HE FECES may become hard and impacted in a patient who is extremely constipated or who refrains from having a bowel movement as long as possible because of a painful condition about the anus. The impaction may become so severe that the patient is not able to expel the feces or the attempt to do so is so painful that the effort is abandoned.

The treatment for an impaction of feces in the rectum has not changed materially through the years. The administration of a cathartic is valueless and may even be contraindicated in the face of an obstruction. Enemas of the soap-suds variety, retention enemas of warm olive oil, and enemas containing small amounts of hydrogen peroxide occasionally are beneficial. When enemas do not produce the desired result, the physician may introduce a well lubricated finger into the rectum and attempt to fracture the hard mass. This manipulation is followed by the administration of a soap-suds enema to clear the rectum of the broken stool. The digital manipulation is painful and disagreeable to the patient and when the impaction is large and stony, administration of an anesthetic may be necessary for removal of the mass.

Help may be obtained in solving this problem if thought is given to the composition of the feces. Feces normally are composed of food residues that are not digested or not absorbed, remains of intestinal and digestive secretions not destroyed or reabsorbed, substances excreted into the intestinal tract, notably phosphates and other salts of calcium, iron, and other metals, and bacterial flora of the intestinal tract with their metabolic end products and cellular elements.<sup>1</sup>

If partial or complete disintegration of the scybalous stool could be accomplished by an enzyme, the vehicle carrying the active agent could wash the fragments out of the rectum. With this concept in mind, 5 ml samples of solutions of various agents were applied to successive 2 gram portions of feces of the im-

---

<sup>1</sup>From the Veterans Administration Hospital, Fort H. Ward, Md.

- 17 J. J. Gosselin, R. E. Brown, A. H. and Adolph R. A. *Physiological standards for men in tropical climates* *Gastro-ent. & Hepatol.* 24, 1, 1943
- 18 J. J. Gosselin, R. E. Brown, A. H. and Adolph R. A. *A study of water, salt and heat exchanges of men in tropical and desert climates* *Am. J. Hyg.* 44 411-433, Nov 1946
- 19 McCance P. A., Ungley C. C., Crosskill J. W. and Widdowson E. M. *Hazards to Man in Ship's Load at Sea 1940-1944* Medical Research Council Special Report Medical Research Council London, No 291 1956 pp 1-44
- 20 Hirshey, G. R. and McCance, R. A. *Effects of carbohydrate and sea water on metabolism of men without food or sufficient water* *Proc Roy Soc London, B* 132: 527-545, July 19 1952
- 21 McCance R. A., and Widdowson E. M. *Mineral metabolism* *Ann. Rev. Biochem.* 13: 315-346, 1944
- 22 Winkler, A. W., Dannawi, T. S., Elkinton J. R. and Peters J. P. *Electrolyte and fluid studies during water deprivation and starvation in human subjects, and effect of ingestion of fluid of carbohydrate and of salt solution* *J. Clin. Invest.* 23 807-815, Sept 1944
- 23 Gamble J. L. *Water requirements of castaways* *Proc Am. Philos. Soc.* 88 131-138, Sept 1944
- 24 Litcher P. H., Consolazio V. and Pace N. *Water balance of survivors of shipwreck in tropical waters* *War Med.* 5 203-206 Apr 1944
- 25 Badet, R. A., Elliot J. W. and Bass D. E. *Renal and hormonal mechanisms of cold diuresis* Abstracts of papers in Physiology *Fed. Proc.* 8 7 Mar 1949
- 26 Badet, R. A., Elliot J. W., and Bass D. E. *Hormonal and renal mechanisms of cold diuresis* In *Envir. Protect. Sect. Report* No. 166 U. S. Quartermaster Climatic Research Laboratory Lawrence Mass. May 1950
- 27 Itazier R. G. *Acclimatization and effects of cold on human body as observed at Little America III on United States Antarctic Service Expedition 1939-1941* *Proc Am. Philos. Soc.* 89 249-255 1945
- 28 Luyet B. J. and Gehlen M. P. *Life and Death at Low Temperatures* Series of Monographs on General Physiology, No 1 Biodynamica Normandy No 1940
- 29 Luyet B. J. *Survival of cells, tissues and organisms after ultra rapid freezing* London Institute of Biology 1951
- 30 Mitchell H. H. and Edman M. *Acclimation and Climatic Stress* Charles C. Thomas Publisher, Springfield Ill 1951
- 31 Wulson F. R. *Responses of Man to a Hot Environment* In *Office Quartermaster General Environmental Protection Division Report* No. 139 Washington D. C. Dec 16 1948
- 32 Adolph E. F. *Water metabolism* *Ann. Rev. Physiol.* 9 381-408 1947

physiological can be demonstrated by the improved performance of physical work after men have been forced to drink sufficient water to completely replace sweat losses.<sup>7, 15</sup>

The only known method of repairing the damage done to the human machine by dehydration is to replace lost body water. The signs and symptoms associated with simple dehydration disappear rapidly and dramatically when water is drunk.

**ACKNOWLEDGMENT** Sincere appreciation is expressed to Dr D B Dill, Deputy Director of Medical Research, at whose instigation this report was undertaken for continued interest and criticism.

#### REFERENCES

- 1 Mellor J W. *Water*. In *Comprehensive treatise on inorganic and theoretical chemistry*. L. N. S. G. & Co. Inc. New York, N. Y. Sept. 1946. Vol. 1 pp 405-505.
- 2 H. d. r. L. J. *Fitness of the Environment*. Macmillan Co. New York, N. Y. 1913.
- 3 Babcock S. N. Metabolic rate: its production and role in vital phenomena. *Research Bull. No. 22*. U. S. Army of W. S. Madison, Wis. Mar. 1912 pp 87-181.
- 4 Willet B. S., Boyd F. C. and Asano. *Biochemistry and Human Metabolism*. Williams & Wilkins Co. Baltimore, Md. 1952.
- 5 Adolph E. F. and Dill D. B. Observations on water metabolism in desert. *Am. J. Physiol.* 123: 369-378 Aug. 1938.
- 6 Ziemer R. L. *Water and electrolyte metabolism*. In Bourne G. H. and Kaddor G. W. (editors) *Biochemistry and Physiology of Nutrition*. Academic Press Inc. New York, N. Y. 1953. Vol. 1 pp 39-56.
- 7 Pitts R. J. P. *Body Water: the Exchange of Fluids in Man*. Charles C. Thomas Publisher Springfield, Ill. 1935.
- 8 Department of the Army Hydrologic and Meteorological Service. Field Water Supply AR 115-20 Nov. 1, 1952.
- 9 *Army Water Supply*. Department of the Army Technical Manual TM 5-295 Aug. 1956.
- 10 *Desert Operations*. Department of the Army Field Manual FM 31-25 Oct. 1955 p 51.
- 11 Smith, H. W. *From Fish to Philosopher*. Little Brown & Co. Boston, Mass. 1953.
- 12 Adolph E. F. Physiological fitness for desert. *Federation Proc.* 2: 158-164 Sept. 1943.
- 13 Ladell W. S. S. Waterflow J. C. and Hudson M. F. Desert climate: physiological and clinical observations. *Lancet* 2: 491-497 Oct. 14, 1944. 527-531 Oct. 21, 1944.
- 14 Dill D. B. *Life, Heat and Alkaloids: Physiological Effects of Hot Climates and Great Heights*. Lectures given at Lowell Institute, Harvard University Press, Cambridge, Mass. 1938.
- 15 McGee W. J. Desert thirst as a disease. *Interstate M. J.* 13: 279-300 1906.
- 16 Goldsmith G. A. Application to human nutrition. In Bourne G. H. and Kaddor G. W. (editors) *Biochemistry and Physiology of Nutrition*. Academic Press Inc. New York, N. Y. 1953. Vol. 2 pp 505-582.
- 17 Pitts G. C., Johnson R. E. and Conzelmann F. C. Work in heat as affected by intake of water, salt and glucose. *Am. J. Physiol.* 142: 253-259 Sept. 1944.
- 18 Adolph E. F. and others. *Physiology of Man in the Desert*. Monographs on the Physiological Sciences. Vol. 1. Interscience Publishers Inc. New York, N. Y. 1947.
- 19 Robinson S. Physiological adjustments to heat. In Lewin, L. H. (editor) *Physiology of Heat Regulation and the Science of Clothing*. W. B. Saunders Co. Philadelphia, Pa. 1949 pp 193-231.

cold diuresis is like water diuresis except that increased chloride excretion obtains in the former

Blood volume decreases after exposure to cold<sup>10</sup> The skin and subcutaneous tissues become dehydrated Frazier<sup>10</sup> maintains that the dehydration is a protective measure against freezing of the skin, for it is well established that dehydration of cells and tissues favors their survival when exposed to extreme cold<sup>11,12</sup> In general, cold depresses the water requirements of man However, when heavy arctic clothing is worn, sweating may occur when men are performing work which results in an energy production equivalent to about 175 calories per square meter of body surface area per hour

### SUMMARY AND CONCLUSIONS

From the review of the scientific data cited, one can derive certain principles concerning the water requirements of man

It is clearly evident that the intake of water needed by man varies under conditions of environment (temperature, humidity, sunlight), and of activity (rest, marching, load carrying)<sup>24</sup> No single table of water allowances can be set up which will apply in all situations The water balance system in man is regulated physiologically and no interpretation of facts justifies a belief that training or will power can change that balance, or keep the human machine in an effective functioning condition without the necessary elements Best evidence to date indicates that constipation is seriously harmed either by drinking sea water alone, or diluted with fresh water<sup>25</sup>

Table 2, which reflects the military point of view concerning water requirements of man, may be open to dangerous misinterpretation It should be emphasized that the table gives minimum requirements for men under temperate conditions temperature around 70°F and relative humidity 50 per cent or less Under no circumstances should this table be applied to men in the desert or tropics Under mild desert conditions, with minimum activity, 2 quarts of drinking water per man are needed each day As the ambient temperature rises or activity increases, the amount of water required by a man per day becomes greater When the temperature approaches 100°F and soldiers are engaged in strenuous maneuvers, more than 12 quarts of water per day per man may be needed to keep the troops in effective functioning condition

As men become acclimatized to heat their voluntary intake of water increases Ordinarily, however, this intake replaces only about one half of the water lost by sweat Thirst is not an adequate index of water requirement in the individual That dehydration resulting from sweat losses in the heat is truly



## MAN'S WATER NEEDS

August 1957)

to warrant the effort whole fish contains only enough water to regenerate the excretion of metabolized nitrogen from the protein in the fish. None of the water of the ingested fish is retained and the subject's own water loss is not impeded. Consequently when water supply is limited ingestion of protein foods is definitely undesirable. Carbohydrate is then the foodstuff of choice. Fat in the fish tested in these studies apparently did not influence the results.

During fasting the daily water requirement of a man who indulges in practically no physical activity is 700 ml. The addition of 100 grams of glucose to the diet could decrease the water requirement chiefly because of the sparing action of carbohydrate on protein. Table 3 illustrates this point. From the table it is evident that at least 100 ml of water for the cristaway may be replaced by 100 grams of glucose with no disturbance of water balance. Moreover the glucose itself contributes to the overall well being of the individual carrying

TABLE 3. Effect of glucose on water requirement of man

Condition	Urinary water excretion in ml	Available body water in ml
Fasting	521	518
Glucose 100 gram	23	360
Reduction	298	158
$G \text{ in in water exchange} = 98 \cdot 158 = 10 \text{ ml}$		

Studies of human volunteers on rafts in the Gulf of Mexico indicated an average daily evaporative loss of 730 ml of water. Assuming minimal exertion and negligible seasickness it is concluded that 500 to 1 000 ml of water will prevent dehydration in semifasting survivors on lifeboats or rafts on tropical seas.

## COLD CLIMATES

In arctic and subarctic areas the problem of adequate water intake by man is not as critical as in hot climates. In those regions the loss of water by sweat is not great and everywhere even on sea ice there are to be found sources of potable water.

Exposure to cold has a significant diuretic effect on man. It has been suggested that this effect is brought about by suppression of the activity of the posterior lobe of the pituitary. Intramuscular injections of Pitressin Tannate (brand of Vasopressin Tannate) inhibit the cold diuresis which stems from a decreased tubular reabsorption of water changes in renal hemodynamics need not be postulated. In many characteristics

tion of in  
inking

n airplane flying over the sea, are  
of water Sea water has such a high  
salts in solution as to render it harm

Proposals have been made that a limited supply of drinking water, on a life raft, could be extended by mixing it with sea water Such a procedure is deleterious, and will effectively shorten man's survival time<sup>22</sup> Hervey and McCance<sup>23</sup> have shown that 3 lines of evidence argue against the addition of sea water to an already limited water supply

1 Drinking of any significant amount of sea water accelerates the increase in the total osmotic pressure of the human body

2 An apparent improved water balance does occur initially after drinking sea water However, fluids are added only to the extracellular spaces and that occurs at the expense of intracellular water Since the latter is not an inexhaustible source, any apparent initial benefit must soon come to an end

3 Over any prolonged period, the apparent gain in water balance is replaced by an osmotic diuresis, which would be self-perpetuating

In view of these facts McCance and co-workers urged that no further credence be given to the unsafe suggestion that castaways drink sea water, even in small amounts added to fresh water rations<sup>23 24</sup> Results obtained by investigators in the United States<sup>25</sup> support this contention

August 1957)

per cent occur during the day these values vary from 30 to 70 per cent. Air movement is usually at a minimum. Under such conditions evaporation from lungs and skin is much reduced and in active men temperature control by sweating is impaired.

However, the total evaporative heat loss in men resting at 34°C and 15 to 75 per cent relative humidity is remarkably constant. In tropical atmospheres men sweat profusely and much unevaporated sweat drips from the skin and is lost insofar as evaporative cooling is concerned. The amount of sweat so wasted increases markedly as rate of work and metabolism increases.

In a hot dry atmosphere a working man may have to evaporate over 1 liter of sweat per hour to regulate his body temperature. Although in a tropical environment less will be lost under comparable conditions of activity even an inactive man in the tropics loses as much as 200 ml of sweat per hour. In order to maintain human efficiency, the water lost in sweat must be replaced by drinking.

Thirst is not an adequate index of the amount of fluid required, for man's thirst is quenched by drinking water long before sweat losses are replenished. Continuous maintenance of hydration by hourly replacement of loss is not wasteful of water; a dehydrated man sweats insignificantly less in the course of an hour's work than does a completely hydrated individual.

In a comparative study of sample tropical and desert environments it has been shown that the heat stress imposed in the Arizona desert is about 2 to 3 times greater than in the Florida tropics. In the desert area about twice the sweat was produced in a 24 hour period by men doing routine military duty as in the tropical zone. Fluid intake was similarly greater in the desert. Urinary volume was similar in each environment. Table 2 summarizes these results.

TABLE 2 Water exchange in man in the Arizona desert and the Florida tropics

Constituent	Desert	Tropics
Fluid intake 1/24 hr	590 ± 203	361 ± 09
Sweat loss 1/24 hr	495 ± 203	233 ± 123
Urinary output 1/24 hr	094 ± 066	097 ± 059

### SURVIVAL AT SEA

Persons who are forced to spend appreciable time on a life raft or in a life boat whether because of the sinking of a surface

## MILITARY DOCTRINE

The thinking of American military leaders on water requirements of man is expressed in various official manuals. The Corps of Engineers of the U S Army has, according to AR 115 20, 12 November 1952,<sup>\*</sup> primary responsibility for providing potable water to troops. TM 5 295, August 1956,<sup>\*</sup> provides the daily water requirements of man in combat, bivouac and in temporary camps (table 1). FM 31-25, Desert Operations states

TABLE 1 Daily water requirements<sup>\*</sup>

Unit consumer	Conditions of use	Gallons per unit consumed per day	Remarks
Man	In combat <i>Minimum</i>	1/2 1	For periods not exceeding 3 days, when operational rations are used
	Normal	2	When field rations are used
		3	Drinking plus small amount for cooking or personal hygiene
	March or bivouac	2	Minimum for all purposes
	Temporary camp	5	Desirable for all purposes (does not include bathing)
	Temporary camp with bathing facilities	15	

*\*Rate of Water Consumption* Trained troops operating in deserts need approximately 1 1/5 gallons of water per man per day. This ration is for drinking, cooking, washing, shaving, and brushing teeth. Since bathing on this ration is impossible, an occasional damp rubdown is substituted. The minimum water ration is three quarters of a gallon per man per day. After 3 days, however, in individual efficiency decreases on this reduced ration. In other countries, trained and conditioned men, traveling at night and finding shade during the day, can operate 5 days on a quart of water per man per day. This ration, however, seriously lowers combat efficiency.<sup>110</sup>

## ROLE OF WATER IN TEMPERATURE REGULATION

The normal body temperature of man is on the average about 37°C (98.6°F). Regulation of this temperature results from the balancing of 2 opposing forces: heat production versus heat loss. Heat is produced by the oxidation of fat, protein, and carbohydrate. Exercise, emotion, shivering, and the specific dynamic action of ingested foods all serve to increase oxidative heat production.

## MAN'S WATER NEEDS

August 1957

Heat is lost from the body by radiation convection and evaporation. In temperatures ranging from  $28^{\circ}\text{C}$  ( $83^{\circ}\text{F}$ ) downward a lightly clad man in the basal metabolic state dissipates 20 to 25 per cent of the total heat lost from evaporation of moisture through the lungs and skin. If the ambient temperature rises above that of the skin—about  $30$  to  $31^{\circ}\text{C}$  or  $85$  to  $87^{\circ}\text{F}$ —the sweat glands in the skin begin to function. This safety mechanism of sweating permits the loss of large amounts of heat from the body through evaporation of sweat from the surface of the skin.  $0.550$  kg calorie of heat is dissipated through the evaporation of  $1$  gram of water from the skin or lungs. Great muscular activity produces appreciable heat in the body and high ambient temperatures interfere with rapid dissipation of body heat. Large quantities of water in the form of sweat are required to dissipate the heat produced. As will be illustrated later in this article the amounts of water lost for brief periods may be as high as several liters per hour under some conditions although a loss of only  $1$  liter per hour can be maintained for a full day.

## DESERT

What is a desert? The outstanding characteristic of a desert is the continual lack of water sometimes accompanied by high mean temperatures, and desiccating winds. These factors acting together put a severe load on the cooling mechanism of the body.

Residence in the desert for any length of time results in an 8-fold or more increase in evaporative loss of water in man. During exercise in the desert rates of evaporation as high as  $1.6$  liters per hour and more have been found. As a consequence, water intake is increased 3 to 6 times. The daily water turnover by the body under these conditions may be as much as 10 to 30 times the daily variation in body weight. Under extremely torrid conditions a total volume of 10 liters of sweat in 24 hours may be produced. This amount of water thus lost must be replaced by drinking.

Studies made on soldiers stationed in Shaiba Iraq during World War II suggest that, when the daily maximum temperature is about  $115^{\circ}\text{F}$ , a daily water intake of approximately  $7\frac{1}{2}$  liters per day is needed to maintain body water balance. On the basis of this work it was recommended that each man should drink enough water to produce 30 oz of urine per day. A low urinary volume was taken as an early sign of collapse from water imbalance. A salt issue of 48 grams per day was recommended. It is common practice to have heavy construction workers drink 0.9 per cent sodium chloride solution when working in the heat.

A liberal intake of salt by persons living and working in desert climates is essential to well being, especially during

## MILITARY DOCTRINE

The thinking of American military leaders on water requirements of man is expressed in various official manuals. The Corps of Engineers of the U S Army has, according to AR 115-20, 12 November 1952,<sup>\*</sup> primary responsibility for providing potable water to troops. TM 5 295, August 1956,<sup>\*</sup> provides the daily water requirements of man in combat, bivouac and in temporary camps (table 1). FM 31-25, Desert Operations states

TABLE 1 Daily water requirements<sup>\*</sup>

Last consumer	Conditions of use	Gallons per unit consumed per day	Remarks
Man	In combat	1/2 1	For periods not exceeding 3 days, when operational rations are used
	Minimum		
	Normal	2	When field rations are used
		3	Drinking plus small amount for cooking or personal hygiene
	March or bivouac	2	Minimum for all purposes
	Temporary camp	5	Desirable for all purposes (does not include bathing)
	Temporary camp with bathing facilities	15	

*\*Rate of Water Consumption* Trained troops operating in deserts need approximately 1 1/5 gallons of water per man per day. This ration is for drinking, cooking, washing, shaving, and brushing teeth. Since bathing on this ration is impossible, an occasional damp rubdown is substituted. The minimum water ration is three-quarters of a gallon per man per day. After 3 days, however, individual efficiency decreases on this reduced ration. In emergencies, trained and conditioned men, traveling at night and finding shade during the day, can operate 5 days on a quart of water per man per day. This ration, however, seriously lowers combat efficiency.<sup>110</sup>

## ROLE OF WATER IN TEMPERATURE REGULATION

The normal body temperature of man is on the average about 37°C (98.6°F). Regulation of this temperature results from the balancing of 2 opposing forces: heat production versus heat loss. Heat is produced by the oxidation of fat, protein, and carbohydrate. Exercise, emotion, shivering, and the specific dynamic action of ingested foods all serve to increase oxidative heat production.

# WATER REQUIREMENTS OF MAN

CHARLES G WILBER Ph D

**T**HE CRADLE of life on this planet was water the most predominant substance in all living Certain physical characteristics of water make it uniquely important in biological processes Except for liquid ammonia water has the highest heat capacity of all liquids The large amount of water in all living things therefore prevents rapid changes in their body temperatures Water has the highest latent heat of evaporation of any substance known and this characteristic makes for body cooling through evaporation of sweat saliva and moisture in the air way<sup>1</sup>

Water the "universal solvent," with its low electrolytic dissociation, its high dielectric constant and the related high dissociation of inorganic substances dissolved in it is uniquely fitted for its role in living organisms<sup>2</sup> including homeothermal man who lives in an environment characterized by wide changes in temperature and moisture In order to maintain the human machine in efficient working condition the total amount of water in the body must be kept within narrow limits despite a large and variable daily turnover A discussion of the general biological significance of metabolic water is given by Babcock<sup>3</sup> It is an older work but contains much useful information

This article will summarize the water requirements of man under the various environmental conditions encountered in the process of living<sup>4</sup>

## AVERAGE WATER EXCHANGE IN MAN

A man of average build contains about 60 to 70 per cent by weight of water or a total of about 40 l<sup>4</sup> In such a man about 2.5 liters of water are lost each day by moisture in expired air by diffusion through the skin, by secretion of sweat and of urine and in the feces A like amount of water is taken in as fluid, as a component of food, and as a by product of the metabolism of foodstuffs Conditions of increased muscular activity or of high environmental temperatures will modify the average daily water turnover in a striking manner<sup>5</sup> Unlike fat and carbohydrate, which yield appreciable water upon oxidation, protein requires water for excretion of nitrogen containing end products, especially urea<sup>7</sup>

From U S Army Chemical Center Md

It will be noted that one patient (L M) had been receiving TP before this study of TCP was begun. This patient's response to TP, given on a demand basis, is recorded along with her response to TCP.

### SELECTION OF PATIENTS

It is generally agreed that the treatment of choice in carcinoma of the breast is initially surgery, then radiation therapy, and then hormone therapy.<sup>4</sup> We chose patients in whom we had exhausted the first two methods of treatment, or, as in the case of M S, those who refused these methods.

For the purpose of standardization of research aiming toward more valid comparisons, King's criteria in the selection of patients were used: "(1) a diagnosis of far advanced cancer of the breast with a variety of metastases, (2) all the surgical treatment practicable completed, (3) benefits possible from roentgen therapy exhausted, (4) establishment of a postmenopausal status, either natural or from irradiation or surgical castration brought about at least three\* months before start of use of testosterone, and (5) development of pain of cancer origin requiring narcotics for relief and/or disability requiring nursing care."<sup>5</sup>

The course of the patients was followed regarding pain, activity, and morale. In recording and graphing the courses, the four levels of each used by King were followed. *Pain* (1) no pain—or so mild that no medication was necessary, (2) mild pain—requiring aspirin or its equivalent, (3) moderate pain—requiring codeine, and (4) severe pain—requiring Demerol Hydrochloride (brand of meperidine hydrochloride) or other opiates. *Activity* (1) full activity, (2) self service, (3) bed and chair with bathroom privileges and some walking, and (4) confined to bed. *Morale* (1) excellent, (2) good, (3) fair, and (4) poor. Believing that relief of symptoms should be as complete as possible, we were quite liberal in our use of narcotics.

Figure 1 gives the graphic profile of the above named symptoms and signs for each of the 12 patients, all of whom lived over 30 days after the beginning of testosterone therapy. Figure 2 shows the life span in years after pathologic discovery with indication of the time after discovery that the ovaries were functioning, and the duration of testosterone administration. All additional therapy is inserted in symbols.

### SIDE EFFECTS OF TREATMENT

The most annoying and constant side effect was hoarsening and deepening of the voice, occurring in 5 patients in impor

\* At least six months in this



# WATER REQUIREMENTS OF MAN

CHARLES G. WILBER, Ph.D.

**T**HE CRADLE of life on this planet was water, the most predominant substance in all living. Certain physical characteristics of water make it uniquely important in biological processes. Except for liquid ammonia, water has the highest heat capacity of all liquids. The large amount of water in all living things therefore prevents rapid changes in their body temperatures. Water has the highest latent heat of evaporation of any substance known, and this characteristic makes for body cooling through evaporation of sweat, saliva, and moisture in the air way.<sup>1</sup>

Water, the "universal solvent" with its low electrolytic dissociation, its high dielectric constant, and the related high dissociation of inorganic substances dissolved in it, is uniquely fitted for its role in living organisms,<sup>2</sup> including homeothermal man, who lives in an environment characterized by wide changes in temperature and moisture. In order to maintain the human machine in efficient working condition, the total amount of water in the body must be kept within narrow limits despite a large and variable daily turnover. A discussion of the general biological significance of metabolic water is given by Babcock.<sup>3</sup> It is an older work but contains much useful information.

This article will summarize the water requirements of man under the various environmental conditions encountered in the process of living.<sup>4</sup>

## AVERAGE WATER EXCHANGE IN MAN

A man of average build contains about 60 to 70 per cent by weight of water or a total of about 49 l. In such a man about 2.5 liters of water are lost each day by moisture in expired air, by diffusion through the skin, by secretion of sweat, and of urine, and in the feces. A like amount of water is taken in as fluid, as a component of food, and as a by-product of the metabolism of foodstuffs. Conditions of increased muscular activity or of high environmental temperatures will modify the average daily water turnover in a striking manner.<sup>5, 6</sup> Unlike fat and carbohydrate, which yield appreciable water upon oxidation, protein requires water for excretion of nitrogen-containing end products, especially urea.<sup>7</sup>

From U. S. Army Chemical Center, Md.

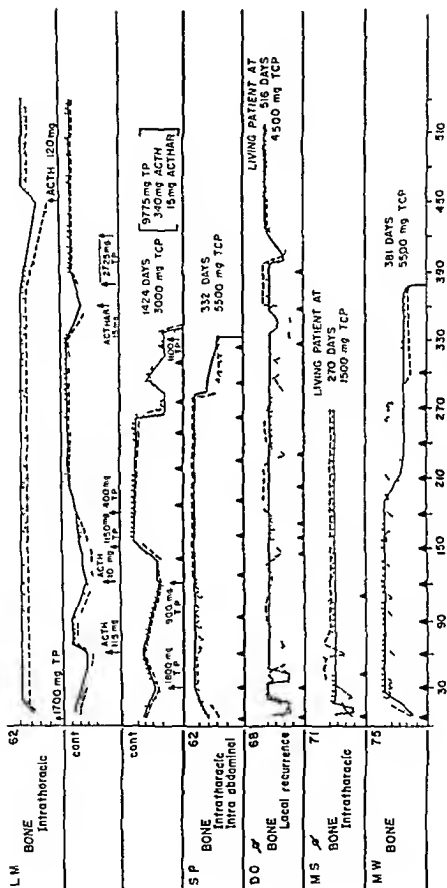


Figure 1 Patients clinical courses after start of testosterone therapy

tance to the patients and in frequency was hirsutism, 3 patients having an increase in hair of the upper lip, 3 of the chin, 1 of the chest, and 1 of the extremities. One patient noted a general loss of hair (thinning) but no patient noted temporal recession or pubic peaking. One patient noted increased stiffness of her joints in general, 1 increased libido, 2, acne 2, nervousness 2, generalized edema, 1, wheezing and choking with subjective swelling of the neck, and 1, tingling in the feet and fingers.

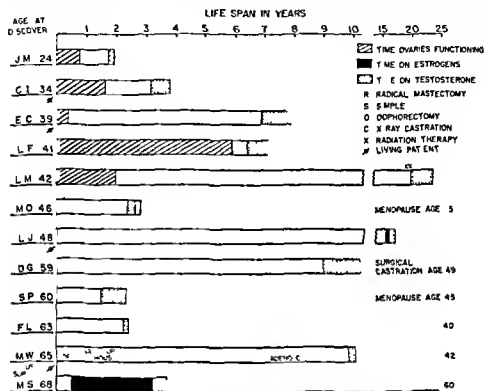


Figure 2. Life span in years of patients after discovery of carcinoma

Temporary side effects were increased stiffness of joints in 2, increased lameness in 3, increased pain in 3, increased weakness in 1, and decreased ambition in 1 patient. No patient was aware of an increase in the size of the lesions, and one noted a temporary decrease after her first injection.

One patient believed that she had a temporary decrease in hearing after her first injection. She said people sounded far away for about two hours the day after the injection, along with twinges of pain and slight aching in her ears.

Hypertrophy and irritability of the clitoris, dysuria and vaginal discharge were observed in King's patients but these side effects were not observed in the present series. Nausea and

vomiting were more prominent in his patients, and one of his patients developed a goiter. Side effects, pleural effusion and dyspnea, noted by King have apparently been eliminated by the use of a low salt diet.

Not all patients were bothered by the side effects, and some manifested none whatsoever. Along with the benefits of therapy, the appetite and weight (without edema) increased. It is noteworthy that only one patient thought that the side effects were troublesome enough to discontinue treatment. She had been noted to be emotionally unstable for years and was thought by some physicians to be psychoneurotic.

Table 1 compares the findings of this study with those of King.

TABLE 1 *Comparison of the findings of this study with those of King<sup>1</sup>*

	King's series	Present series
Patients treated	18	12
Patients surviving over 30 days	13	12
Patients showing no improvement	2	0
Patients showing minimal improvement	4	3
Average survival time in days of patients who survived over 30 days	250	358 349
Patients showing a temporary increase in symptoms after injection	Majority	2
Therapy time without codeine	79"	66"
Therapy time without Demerol	93"	85"
Therapy time without invalidism	75"	73"
Therapy time without depression	75"	89"
Frequency of injections	12/mo	1/mo

Survival time of 8 patients who have died

Survival time of total group of 12 patients

First two injections only

### SUMMARY AND CONCLUSIONS

Twelve patients with terminal breast cancer treated with Depo Testosterone Cyclopentylpropionate (brand of testosterone cyclopentylpropionate (TCP)) have been observed and the results compared with those of a similar series treated with testosterone propionate (TP).<sup>2</sup>

No way was revealed in which the response of a patient might be predicted. The results were so far from uniform in the time of survival after the start of testosterone therapy that average values tend to lose some of their meaning.

The responses were all favorable, all patients surviving over 30 days after the start of testosterone therapy. Only one patient found the side effects worse than slightly annoying.

King<sup>3</sup> described a correlation between survival time on testosterone therapy and the presence or absence of a temporary increase in severity of symptoms. This series did not confirm King's observation. As in his series, relief of bone pain was the greatest effect of therapy, and activity and morale varied inversely with the level of pain in most cases. Appetite, weight and strength also followed closely.

The patients with bone metastases did much better in general than those with predominantly intrathoracic and/or cerebral metastases. The survivals of the latter group after start of testosterone therapy were 36, 43, 69, and 312 days and thus 3 of the 4 were much lower than the average of all 12 patients.

Little or no cyclic disturbance was noted under this program of 500 mg. TCP per month. The frequency of side effects was also less than that noted by King.

On the basis of the comparison of these two somewhat limited studies we conclude that:

- 1 Testosterone has a definite place in the palliative therapy of carcinoma of the breast after operative and radiation therapy have been given adequate trials.

- 2 TCP as used herein compares favorably with TP as used by King in (a) effectiveness in relief of bone pain maintaining activity at high levels, maintaining morale at high levels and prolonging life and increasing the patient's usefulness, (b) undesirable side effects, (c) dangers and toxicity, and (d) ease and convenience for the patient and the doctor in frequency of injections and amount needed.

- 3 TCI appears to be the drug of choice over TP in the palliative androgen therapy of advanced carcinoma of the breast and deserves further clinical evaluation.

---

ACKNOWLEDGMENT The author wishes to express his appreciation to Dr. Mark A. Hayes for guidance and for use of the Yale Tumor Clinic facilities in this investigation.

## REFERENCES

- 1 Warren W D and Hayes M A Comparative study of anabolic effects of 3 androgenic steroids *Proc Soc Exper Biol & Med* 79 503 505 Mar 1952
  - 2 Hayes M A Personal communication
  - 3 King W G Treatment of far advanced carcinoma of breast present status of testosterone therapy *Arch Surg* 61 630-633 Oct 1950
  - 4 Farrow J H and Woodard H Q Influence of androgenic and estrogenic substances on serum calcium in cases of skeletal metastases from mammary cancer *J A. M. A.* 118 339-343 Jan 31 1942
  - 5 Nathanson I T Sex hormones and castration in advanced breast cancer *Radiology* 56 535 551 Apr 1951
- 

"At the University of Iowa we stick quite closely to an old fashioned therapeutic armamentarium largely simple bland lotions creams, liniments, ointments and the like adding only the newer remedies which we can prove to be of value This is not because of ignorance of the new, nor does it signify a reverence for antiques But our use of these older medications is absolutely incomprehensible to many of the physicians with whom I have contact They are up to date applying the latest antibiotics antihistamines antipruritics and hormones while I am a horse and buggy dermatologist These doctors get results, too sometimes disastrous but usually good So do I without the disasters "

—ROBERT G. CARNEY M.D.  
in *South Dakota Journal of Medicine  
and Pharmacy* p 377 Oct 10 1956

# SENSITIVITY OF MALE RANA PIPIENS TO THE SPERMATOZOA RELEASING PRINCIPLE OF HUMAN PREGNANCY URINE

MORRIS D SCHNEIDER Major MC USA

MELVIN A FACKLER

ROLAND S ARONSON Colonel MC USA

**R**ELASE of spermatozoa from the testes of hibernating amphibia may be induced by injections of either crude extracts of anterior pituitary or the urine of a pregnant woman<sup>1-4</sup>. A kaolin adsorption technic or some variation of it has been applied to urine to concentrate the gonadotropin of pregnancy<sup>5-10</sup>. The concentrates contain chemically complex impurities, and information about them and the role they play in the male frog test for pregnancy is sparse. Recent evidence suggests that a luteinizing hormone (LH) and an LH like substance contained in human chorionic gonadotropin (HCG) are concerned in the release of spermatozoa from male *Rana pipiens*<sup>11</sup>.

The present investigation has been restricted to studies of the biological activity and certain other properties of concentrates of the urinas of pregnant women attained by a modified kaolin adsorption technic. The studies reported are as follows: (1) a comparison of the responses of male *Rana pipiens* and immature female white mice to spermatozoa releasing principle and ovarian hemorrhagic follicle inducing substance; (2) the qualitative identification of certain organic materials present in the prepared concentrate of human pregnancy urine, and (3) a limited investigation of the stability of the spermatozoa releasing principle contained in the concentrate. The preparations were bioassayed semiquantitatively. The results reaffirm the sensitivity and reliability of the male *Rana pipiens* test as an effective, practical, and rapid procedure for supplementing the clinical diagnosis of pregnancy.

The modified kaolin adsorption technic for concentrating urinary chorionic gonadotropin has been used in several thousand routine qualitative tests during the past two years. In an

arbitrarily selected group of patients, positive tests were obtained on 93 per cent of those who later proved to be pregnant. No false positive tests were reported.

### METHODS AND MATERIALS

**Preparation of Crude Concentrate** The unpreserved urines of pregnant women who had experienced from 50 to 80 days of amenorrhea, constituted the starting material. The kaolin adsorption techniques of Scott<sup>9</sup> and Dekanski<sup>10</sup> were applied in the following manner. 3 to 5 drops of an alcoholic solution containing 1 per cent bromeresol green and 3 per cent phenolphthalein were added to a liter of urine. The urine was acidified with 5 to 10 ml of 20 per cent hydrochloride to about pH 4, as indicated by a yellow end point. Fifty milliliters of a 20 per cent aqueous suspension of kaolin was added, the mixture shaken, and the adsorbate permitted to settle out for about 1 hour.

The supernatant liquid was decanted and the kaolin centrifuged for 3 minutes at 1,000 to 1,500 r p m. About 2 ml of normal sodium hydroxide solution was added to the lightly packed kaolin adsorbate. A purple aqueous phase was separated by centrifugation for 10 minutes at 3,500 r p m and decanted into a clean test tube. Five per cent hydrochloride was introduced drop by drop until the aqueous phase showed an intense green or blue green end point (pH 6 to 6.5). Coincident with this color change, there usually formed a massive, flaky blue green precipitate.

The aqueous suspension was diluted to 2 per cent of the volume of the starting urine. Fiftyfold concentrates, prepared from 100 to 120 ml of urine, were used routinely in qualitative frog tests.

**Purified Urinary Gonadotropin** The crude suspension was centrifuged at low speed and the aqueous phase separated. This was shaken with two volumes of cold acetone and the mixture held at 0°C for 2 hours. A brownish precipitate formed and after one washing in acetone was redissolved in distilled water to 2 per cent of the starting volume of the urine. The aqueous extract was shaken with one fourth volume of chloroform, centrifuged at low speed, and refrigerated. The spermatozoa releasing substance was contained in the aqueous phase. The insoluble residue derived from the crude suspension was resuspended in water to 0.5 per cent of the original volume of the urine.

**Bioassay of Concentrates** *Rana pipiens* Preparations were assayed for spermatozoa releasing activity by a semiquantitative technique. An arbitrary scale was adopted for measuring the intensity of the response, similar to that reported by Burgos and



# SENSITIVITY OF MALE RANA PIPIENS TO THE SPERMATOZOA RELEASING PRINCIPLE OF HUMAN PREGNANCY URINE

MORRIS D SCHNEIDER Major MC USA

MELVIN A. FACALER

ROLAND S ARDNSON Colonel MC USA

**R**ELASE of spermatozon from the testes of hibernating amphibia may be induced by injections of either crude extracts of anterior pituitary or the urino of a pregnant woman<sup>1-4</sup> A kaolin adsorption technic or some variation of it has been applied to urino to concentrate the gonadotropin of pregnancy<sup>5-10</sup> The concentrates contain chemically complex impurities and information about them and the role they play in the male frog test for pregnancy is sparse Recent ovidence suggests that a luteinizing hormone (LH) and an LH like substance contained in human chorionic gonadotropin (HCG) are concerned in the releaso of spermatozoa from male *Rana pipiens*<sup>11</sup>

The present investigation has been restricted to studies of the biological activity and certain other properties of concentrates of the urines of pregnant women attained by a modified knolin adsorption technic The studies reported are as follows (1) a comparison of the responses of male *Rana pipiens* and immature female white mice to spermatozoa releasing principle and ovarian hemorrhagic follicle inducing substance (2) the qualitative identification of certain organic materials present in the prepared concentrate of human pregnancy urino and (3) a limited investigation of the stability of the spermatozoa releasing principle contained in the concentrate The preparations were bio assayed semiquantitatively The results reaffirm the sensitivity and reliability of the male *Rana pipiens* test as an effective practical, and rapid procedure for supplementing the clinical diagnosis of pregnancy

The modified knelin adsorption technic for concentrating urinary chorionic gonadotropin has been used in several thousand routine qualitative tests during the past two years In an

---

From Third U S Army Medical Laboratory Fort Monmouth Ga Maj Schneider is now assigned to 406th Medical General Laboratory APO 343 San Francisco Calif

arbitrarily selected group of patients, positive tests were obtained on 93 per cent of those who later proved to be pregnant. No false positive tests were reported.

### METHODS AND MATERIALS

**Preparation of Crude Concentrate** The unpreserved urines of pregnant women who had experienced from 50 to 80 days of amenorrhea, constituted the starting material. The kaolin adsorption techniques of Scott<sup>9</sup> and Dekaaski<sup>10</sup> were applied in the following manner: 3 to 5 drops of an alcoholic solution containing 1 per cent bromeresol green and 3 per cent phenolphthalein were added to a liter of urine. The urine was acidified with 5 to 10 ml of 20 per cent hydrochloride to about pH 4, as indicated by a yellow end point. Fifty milliliters of a 20 per cent aqueous suspension of kaolin was added, the mixture shaken, and the adsorbate permitted to settle out for about 1 hour.

The supernatant liquid was decanted and the kaolin centrifuged for 3 minutes at 1,000 to 1,500 r p m. About 2 ml of normal sodium hydroxide solution was added to the lightly packed kaolin adsorbate. A purple aqueous phase was separated by centrifugation for 10 minutes at 3,500 r p m and decanted into a clean test tube. Five per cent hydrochloride was introduced drop by drop until the aqueous phase showed an intense green or blue green end point (pH 6 to 6.5). Coincident with this color change, there usually formed a massive, flaky blue green precipitate.

The aqueous suspension was diluted to 2 per cent of the volume of the starting urine. Fiftyfold concentrates, prepared from 100 to 120 ml of urine, were used routinely in qualitative frog tests.

**Purified Urinary Gonadotropin** The crude suspension was centrifuged at low speed and the aqueous phase separated. This was shaken with two volumes of cold acetone and the mixture held at 0°C for 2 hours. A brownish precipitate formed and after one washing in acetone was redissolved in distilled water to 2 per cent of the starting volume of the urine. The aqueous extract was shaken with one fourth volume of chloroform, centrifuged at low speed, and refrigerated. The spermatozoa releasing substance was contained in the aqueous phase. The insoluble residue derived from the crude suspension was resuspended in water to 0.5 per cent of the original volume of the urine.

**Bio assay of Concentrates** *Rana pipiens* Preparations were assayed for spermatozoa releasing activity by a semiquantitative technique. An arbitrary scale was adopted for measuring the intensity of the response, similar to that reported by Burgos and

Ladman<sup>11</sup> The crude concentrates of the urines of pregnant women were diluted in saline solution or distilled water so that each inoculum of 2 ml contained total solids ranging from 3.5 to 70 mg. Injections were made into the dorsal lymph sacs of normal healthy male frogs. Cloacal contents were expelled into test tubes and examined microscopically for spermatozoa. *Immature female mice* White mice under 21 days of age were used. Each dilution of the urinary preparations tested contained a different amount of total solids. Five injections of 0.2 ml each were made subcutaneously, at 3 to 4 hour intervals on 2 consecutive days. Mice were sacrificed 72 hours after the first injection. The ovaries and uterus were excised and examined under a dissecting microscope for hemorrhagic follicle end points, and total wet weight was determined with a sensitive balance.

**Spectroscopic Measurements** Partially purified aqueous concentrates were examined spectroscopically in the ultraviolet region. A powerful ultraviolet absorbing compound was present in the preparations. It was necessary to dilute each extract 1:50 in distilled water in order to obtain the spectral measurements. The compound exhibited a sharp extinction maximum at 288 to 290 m $\mu$  which was indistinguishable from that observed in a reference solution of uric acid. Colored derivatives of crude and purified aqueous concentrates were obtained by reaction with sulfuric acid-sulfhydryl reagent (BCyT), according to a method of Dische.<sup>12</sup> Readings were made in a Beckman Model DU Spectrophotometer.

## RESULTS

**Semiquantitative Assays** Yields of crude and purified concentrates after drying to constant weight, were approximately 700 and 165 mg respectively per liter of urine. Bioassays of the latter preparations in frogs indicated that there were 150 to 200 effective doses of reactive substance per liter of urine. The toxicity of the concentrates for frogs was low. Intense stimulation of release of spermatozoa was achieved with about 7 to 10 mg of crude concentrate. Intense responses frequently were accompanied by the appearance of "rosettes" described by Burgos and Ladman<sup>11</sup> as numerous spermatozoa clustered about Sertoli cells. Data of assays are summarized in table 1. The stability of an aqueous preparation is illustrated in table 2. Comparative assays of crude and purified preparations in *Rana pipiens* and in mice are shown in table 3. Partly purified aqueous preparations contained uric acid and a carbohydrate component (fig. 1).

## DISCUSSION

Concentrates of urine prepared by kaolin adsorption technique contain organic constituents among which are powerful ultra

violet light absorbing nucleic acid, uric acid, and carbohydrate substances. The nucleic and uric acids appear not to be participants in the spermatozoa releasing action in *Rana pipiens*. Prep

TABLE 1 Stimulation of release of spermatozoa in *Rana pipiens*

Inoculum equivalent <sup>1</sup>	Response <sup>2</sup>	
	Crude whole suspension	Purified aqueous phase
50	3+	3+
35	3+R <sup>3</sup>	3+
25	2+	3+
20	2+	2+
15	2+R	3+
10	3+	3+R
7.5	1+	2+ (1.1 mg) <sup>4</sup>
5	2+ (3.5 mg) <sup>4</sup>	
	Residue only <sup>5</sup>	
200	3+	
140	3+	
100	3+	
80	3+R	
60	1+	
50	1+	
30	1+ (2.6 mg)	

<sup>1</sup> Equivalent in ml of urine contained in 2 ml of concentrate

<sup>2</sup> + few spermatozoa per low power microscopic field 2+ moderate numbers of spermatozoa 3+ numerous spermatozoa

<sup>3</sup> Rosette like agglomeration of actively motile spermatozoa

<sup>4</sup> The number of milligrams shown in parentheses is the quantity of total solids in the diluted preparation which elicited release of spermatozoa

<sup>5</sup> Precipitate of crude extract resuspended in distilled water

arations that contain the spermatozoa releasing principle are relatively rich in a saccharide material, the colored derivative of which in sulfuric acid and in the presence of cysteine absorbs strongly in the 404 to 408 m $\mu$  region. The significance of the sac

charide is not known, however the information derived from this study affords no basis for suspecting that more than one organic compound is responsible for expulsion of spermatozoa from the testes of *Rana pipiens* and for inducing the ovarian hemorrhagic follicle end point of the immature female mouse. Under the conditions of our experiments similar end points in male frogs and in immature female mice were obtained with the same preparations of human pregnancy urine.

TABLE 2 Stability of spermatozoa-releasing principle of partly purified concentrate as determined by response<sup>1</sup> of *Rana pipiens*

Inoculum equivalent <sup>2</sup>	Days after preparation of concentrate					
	10		45	90		190
100	3+R <sup>3</sup>					
50	3+	(3+) <sup>4</sup>	3+R	3+R	(2+) <sup>5</sup>	3+
35	3+	(3+)		3+R	(2+)	
25	3+R	(2+)	3+R	1+	(2+)	1+
20	3+R	(3+R)	3+R			
15	3+R	(0)	3+	+	(1+)	1+
10	2+	(0)	3+	3+	(3+R)	1+
7.5	1+	(0)	3+	1+	(1+)	

1 + few spermatozoa per low power microscope field 2+ moderate numbers of spermatozoa 3+ numerous spermatozoa

2 Equivalent in ml of urine contained in 2 ml of concentrate

3 R settle-like agglomeration of actively motile spermatozoa

4 Preparation dialyzed for 10 days at 5°C against distilled water

5 Preparation heated at 57-58°C for 30 minutes

In the performance of routine diagnostic tests questions arise as to the stability of the spermatozoa-releasing principle. This study has disclosed that the concentrates reported herein possess good stability and that the gonadotropin principle present in them is relatively resistant to heat, acid, alkali, acetone, and chloroform. Active particles may have undergone fragmentation, inasmuch as dialyzed preparations show about 50 per cent of the activity of the original concentrate. Unpreserved but refrigerated crude concentrates have retained their spermatozoa-releasing activity for 60 days. Partly purified aqueous concentrates preserved with chloroform have retained their activity for 190 days. It has been found practicable to prepare concentrates of urine and store them under refrigeration while awaiting supplies of frogs. Simultaneous qualitative tests with 10 or more specimens can be accomplished rapidly and economically.

TABLE 3 *Comparative bio assay of concentrates of human pregnancy urine in immature female white mice and in male Rana pipiens*

Inoculum equivalent <sup>1</sup>	Mice		<i>Rana pipiens</i>
	Ovaries and uterus (mg)	Hemorrhagic follicles <sup>2</sup>	Response
(Crude suspension pregnant)			
50	67	++	Positive
50	70	++	
50	68	++	
25	58	++	Positive
25	59	++	
25	51	++	
12.5	50	++	Positive
12.5	49	++	
12.5	49	++	
5	64	+-	Positive
5	41	+-	
5	21	--	
(Purified aqueous phase pregnant)			
50	52	++	Positive
50	57	++	
50	48	++	
25	45	++	Positive
25	49	++	
25	44	++	
12.5	39	++	Positive
(Crude suspension non pregnant)			
50	51	--	Negative
50	55	--	
50	39	--	
(Controls, 8 mice)	13.20 (Average 15)		

<sup>1</sup> Equivalent in ml of urine contained in 2 ml of concentrate<sup>2</sup> ++ in both ovaries +- in one ovary -- in neither ovary

11 Burgos N H and Ladman A J Effect of purified gonadotropins upon release of spermatozoa in frog *Rana pipiens* *Proc Soc Exper Biol & Med* 88 484 487 Mar 1955

12 Disch Z. Spectrophotometric method for determination of free pentos and pentose in nucleotides *J Biol Chem* 181 379-392 Nov 1949

13 Schaeider M D Low gonadic response of *Rana pipiens* in pregnancy test in summer *U S Armed Forces M J* 8 1169-1170 Aug 1957

---

### HELMINTHIC DISEASES IN THE UNITED STATES

"Trichinosis exemplifies the importance of helminthic diseases in this country the number of cases of trichinosis in the United States exceeds that in any other country in the world Tropical diseases are brought to the United States by people returning or migrating from other countries an example is American trypanosomiasis the first case of which in the United States was reported in Texas in 1955 *Schistosoma mansoni* and *Wuchereria bancrofti* are being brought to the mainland of the United States from the West Indies especially from Puerto Rico Many cases of schistosomiasis have been reported since 1950 especially in northern cities such as New York and Chicago Parasites endemic in one area within the United States are carried occasionally into other areas as is illustrated by an outbreak of infestation with *Strongyloides* in a school in Illinois after the arrival of children from New Mexico Two million American tourists have visited foreign countries since World War II Increased attention to the principles of sanitation and hygiene is urgently needed in order to reduce the disability now caused by parasites and to prevent parasites from establishing themselves in new areas "

—CARROLL L BIRCH M D

BASIL P ANAST M D

in *Journal of the American Medical Association*  
p 121 May 11 1957

cordial leads. No abnormality of the QRS complex was noted.

The patient's course in the hospital was progressively rapidly downhill. She complained continuously of chest pain and a moderate cough. She was frequently given supplemental oxygen throughout her hospital stay. On 4 May it was decided to administer streptomycin sulfate and penicillin parenterally. She remained afebrile and her pulse rate was constantly recorded to be between 100 and 110. Her blood pressure continued at 110/70 mm Hg, and her respirations rose gradually to 15 per minute. On 7 May three attempts at thoracentesis were unsuccessful. She became anorectic, her respirations became shallow and she died quietly at 1215 on 7 May.

### DISCUSSION

Dr. Soderstrom: This case deals with an elderly woman who had enjoyed good health until the age of 70, except for the fact that she had had pleurisy of unknown cause at the age of 30 and a nervous breakdown at the age of 56. She died of a progressive illness 6 months after the onset of cough 3 weeks subsequent to the onset of chest pain and 7 weeks following the onset of dyspnea. Cough was intermittently productive of thick mucous material. Chest pain on the left side was at first intermittent and pleuritic in nature, later persistent and associated with localized tenderness over the chest wall. Dyspnea was without orthopnea until 1 day prior to death. It is possible that weight loss beginning 3 years prior to death marked the true onset of the patient's illness.

Objective findings were those of respiratory distress without cyanosis or clubbing of the fingers, left-sided pleural effusion and right-sided pulmonary congestion. Associated findings were tachycardia, hypertension, an aortic systolic murmur, arteriosclerosis of the abdominal aorta and kyphosis of the dorsal spine. The findings of an enlarged heart and of a mass in the right flank are questionable since they were based on a small examination of the abdomen. The electrocardiographic findings were not helpful. Laboratory findings were conspicuously unhelpful. There was no anemia, no leukocytosis and the



**Physical Examination** Physical examination revealed an emaciated senile white female who was alert rational and complained of pain in the left side of the chest. She was lying on her right side with her head slightly elevated and breathing noisily with considerable effort. She was 62 inches tall and weighed 100 pounds. Per temperature was 98.6°F, pulse rate, 100 and blood pressure 220/110 mm Hg. Examination of the chest demonstrated increased tactile fremitus on the right side and dullness of the left side of the chest from the 4th intercostal space downward posteriorly with localized tenderness over the left 5th and 6th intercostal spaces. Auscultation revealed decreased breath sounds over the area of the left lung and absent breath sounds over the left lower lung. Fine crepitant rales were present over the right upper lung. The cardiac rhythm was regular at 100 per minute and occasional extrasystoles were noted. A grade 2 blowing systolic murmur was heard at the base of the heart radiating to the neck and downward to the apical region. The liver edge was palpable 4 fingers breadth below the right costal margin in the midclavicular line and was tender to palpation. A moderately tender, palpable mass was noted in the right flank and was thought to be kidney. The bowel sounds were hyperactive. Pulses were prominent in all extremities. The skin was dry and wrinkled.

**Laboratory Findings** Hemoglobin was 15.5 grams per 100 ml, hematocrit 45 ml per 100 ml, sedimentation rate 18 mm, white blood cell count, 7900 per  $\mu$ l with a differential of 82 per cent neutrophils, 14 per cent lymphocytes, 2 per cent monocytes, 1 per cent eosinophils, and 1 per cent basophils. A serologic test for syphilis was negative. No urinalysis results were recorded. A roentgenogram of the chest showed extensive arteriosclerotic calcification in the aorta with marked elongation and tortuosity. The heart did not appear enlarged. In the right lung field there was marked pulmonary congestion and vascular prominence in and about the hilum tapering toward the periphery. The left lung was obscured by a large amount of pleural fluid. In the midthorax this fluid extended to about the level of the 10th rib and showed a lateral upward sweep occupying almost one half of the thorax at its midhorizontal level. A roentgenogram of the abdomen revealed nothing unusual except marked arteriosclerosis of the abdominal aorta. A smear of the sputum disclosed no acid fast organisms.

**Course in Hospital** The patient was placed in isolation because of the possibility of tuberculosis. She was given a low salt diet and oxygen by the nasal route continuously. Her digitoxin dosage was increased and a mercurial diuretic was given. The chest pain and restlessness required morphine every four hours for relief.

An electrocardiogram revealed depressed S-T segments in standard leads I, II, aVL and aVF and in all the lateral pre

viously sensitized pleural membrane. Therefore, tuberculous effusions occur most frequently 3 to 6 months after the primary infection. In the later stages of the disease effusions are less common probably because of pleural symphysis with obliteration of the pleural space.<sup>4</sup> Our patient's cough started some six months before discovery of pleural effusion, but it would seem extremely unlikely to me that a person would contract primary tuberculosis at such a late age. Rupture of an old tuberculous lesion with seeding of bacilli onto the pleural membrane is of course, possible, but we would expect to see some evidence of previous tuberculosis on the chest film. The sputum smear though of little true aid, might possibly have been positive were this tuberculous with such productive sputum. In military tuberculosis abundant effusions do not occur and her chest film does not resemble military involvement.

The acute bacterial, fungal, viral and rickettsial pneumonias can be readily excluded. With this much involvement some clinical or laboratory evidence of an acute infection should be present. It is only when the acute phases of the pneumonias are suppressed by inadequate antibiotic therapy that sterile empyemas develop which are difficult to interpret. Aspiration pneumonia, of course, is a possibility but it would not explain the patient's pain unless a lung abscess with rupture, empyema and cellulitis of the chest wall had occurred. One would expect such an abscess on the right rather than on the left side, purulent rather than mucoid sputum, and there should be some evidence of a systemic reaction. Much on the same basis we can exclude a pulmonary abscess secondary to pulmonary infarction, especially since we find no obvious source of peripheral emboli or evidence of rheumatic heart disease. The absence of an electrocardiographic pattern of right heart strain is also helpful. Nevertheless, a simple pulmonary abscess with involvement of the pleura remains a possibility. There is nothing in particular that favors this diagnosis but it must be considered since such abscesses can occur without any known provocation.

It seems very unlikely that this patient had chronic pulmonary suppurative disease such as bronchiectasis or cystic disease of the lung with the first development of symptoms at the age of 76 and without evidence of polycythemia, clubbing, or cor pulmonale. A much more likely possibility than inflammatory disease is I think an intrathoracic tumor. An aneurysm of the transverse arch usually enlarges to the left and presses on the trachea, esophagus and the left main stem bronchus. It can produce atelectasis with abscess and empyema or may lead to pleural effusion. However the patient's serologic tests were negative, the peripheral pulses were equal and there was no hoarseness or dysphagia. I think that the absence of paratracheal adenopathy is as good evidence against the lymphomas and sarcoidosis as is the patient's age. This more or less narrows the possibilities down to malignant lesions of the lung with involvement of the pleura or vice versa.

Primary malignant tumors of the pleura are extremely rare and tumors reported as derived from the pleura are regarded by some pathologists

1. The pleural rather than fluid or the pleura was very thickened and  
4. The lateral up-sweep seen on the chest film is most typical  
of pleural effusion. This characteristic curve is due to the fact that  
laterally the mass of fluid tapers upward to a thin edge.

Two reliable findings stand out: (1) a massive pleural effusion and (2) the subjective complaint of severe chest pain. Approaching the differential diagnosis from this standpoint, the first possibility is that of a hydrothorax due to congestive failure. The patient had hypertension, arteriosclerosis, and a calcified aortic valve. She had kyphosis of the dorsal spine and right ventricular hypertrophy has been reported secondary to kyphoscoliosis even in the absence of intrinsic cardiac disease.<sup>1</sup> She received digitalis and diuretics and this might explain why the hepatomegaly noted on physical examination was not apparent on a flat plate of the abdomen.

Against congestive failure as the primary cause of this patient's pleural effusion are the lack of peripheral edema, the location of the effusion, and the presence of chest pain with localized tenderness over the 5th and 6th intercostal spaces. In the majority of cases of pleural effusion due to congestive heart failure there is a predominance of fluid in the right pleural cavity. When bilateral, the amount of fluid is usually greater on the right. Why this occurs has been cause of much discussion in the literature. If pressure on the pulmonary veins is of significance, the dilated right auricular appendix may be the key to the problem. Most likely multiple factors are involved. An important factor may be the tendency of patients in congestive failure to lie on the right side.<sup>2</sup> Our patient did elect to lie on the right side yet her effusion was in the left pleural cavity.

Another significant finding against congestive failure with hydrothorax is the presence of pain. Chest pain secondary to hydrothorax is very unusual and occurs only if the mediastinal structures are displaced and put under stretch. Such pain is never associated with localized tenderness. On the basis of the above evidence I will exclude congestive failure. Hydrothorax secondary to renal disease, Laennec's cirrhosis, subdiaphragmatic lesions, or a Meigs' syndrome are mentioned only for completeness; there is nothing to favor any of these diseases.

At this point in the discussion it seems appropriate to consider inflammatory pulmonary diseases, and our primary concern among these is pulmonary tuberculosis. An acid fast infection is a distinct diagnostic possibility in this patient. At the age of 36-40 years prior to the onset of her terminal illness, the patient had pleurisy of unknown cause. We do not know whether this pleurisy was associated with effusion, nor do we know the patient's sensitivity to tuberculin. Recent experience indicates that although active tuberculosis does not follow dry pleurisy as often as was once thought, most cases of so-called idiopathic serous effusions are in fact tuberculous. Rich<sup>3</sup> has demonstrated that tuberculous pleural effusions have their source in the rupture of a tuberculous lesion, usually a lymph node, onto a pre-

viously sensitized pleural membrane. Therefore, tuberculous effusions occur most frequently 3 to 6 months after the primary infection. In the later stages of the disease effusions are less common, probably because of pleural symphysis with obliteration of the pleural space.<sup>4</sup> Our patient's cough started some six months before discovery of pleural effusion, but it would seem extremely unlikely to me that a person would contract primary tuberculosis at such a late age. Rupture of an old tuberculous lesion with seeding of bacilli onto the pleural membrane is of course, possible but we would expect to see some evidence of previous tuberculosis on the chest film. The sputum smear, though of little true aid might possibly have been positive were this tuberculous with such productive sputum. In military tuberculosis abundant effusions do not occur and her chest film does not resemble military involvement.

The acute bacterial, fungal viral, and rickettsial pneumonias can be readily excluded. With this much involvement some clinical or laboratory evidence of an acute infection should be present. It is only when the acute phases of the pneumonias are suppressed by inadequate antibiotic therapy that sterile empyemas develop which are difficult to interpret. Aspiration pneumonitis, of course, is a possibility, but it would not explain the patient's pain unless a lung abscess with rupture, empyema, and cellulitis of the chest wall had occurred. One would expect such an abscess on the right rather than on the left side, purulent rather than mucoid sputum, and there should be some evidence of a systemic reaction. Much on the same basis we can exclude a pulmonary abscess secondary to pulmonary infarction, especially since we find no obvious source of peripheral emboli or evidence of rheumatic heart disease. The absence of an electrocardiographic pattern of right heart strain is also helpful. Nevertheless, a simple pulmonary abscess with involvement of the pleura remains a possibility. There is nothing in particular that favors this diagnosis but it must be considered since such abscesses can occur without any known provocation.

It seems very unlikely that this patient had chronic pulmonary suppurative disease such as bronchiectasis or cystic disease of the lung with the first development of symptoms at the age of 76 and without evidence of polycythemia, clubbing, or cor pulmonale. A much more likely possibility than inflammatory disease is, I think, an intrathoracic tumor. An aneurysm of the transverse arch usually enlarges to the left and presses on the trachea, esophagus, and the left main stem bronchus. It can produce atelectasis with abscess and empyema or may lead to pleural effusion. However, the patient's serologic tests were negative, the peripheral pulses were equal and there was no hoarseness or dysphagia. I think that the absence of paratracheal adenopathy is as good evidence against the lymphomas and sarcoidosis as is the patient's age. This more or less narrows the possibilities down to malignant lesions of the lung with involvement of the pleura or vice versa.

Primary malignant tumors of the pleura are extremely rare, and tumors reported as derived from the pleura are regarded by some pathologists

as of pulmonary origin Doubt<sup>1</sup> reported five cases of primary pleural epithelioma among over 500 000 admissions to the Henry Ford Hospital Sarcomas of the diaphragmatic structures are even rarer Statistically therefore the chances for pulmonary carcinoma are infinitely better Could this patient have had a metastatic pulmonary lesion? In a female metastases usually reach the lungs from primary malignant tumors in the thyroid breast gastro-intestinal tract or kidney Chorioepitheliomas can also metastasize to the lungs The right kidney was palpated in this patient at the time of the initial physical examination but no mass was seen in the right flank on a roentgenogram There is nothing in the protocol to implicate the other organs that commonly are sites of malignancies with pulmonary metastases although admittedly the patient's stay in the hospital was too short for adequate screening Primary carcinoma of the lungs therefore should be placed at the top of the list in the differential diagnosis It can mimic any other pulmonary disease It explains this patient's course symptoms and findings better than any other entity Pleural and later chest wall involvement explains why the patient's pain which at first was pleuritic persisted after the development of pleural effusion and became associated with local tenderness Chest wall involvement also explains why the patient sought relief by lying on the right side Pulmonary carcinoma fits the patient's age group better than does tuberculosis which admittedly cannot be definitely excluded

#### Dr Sode's diagnoses

- 1 Primary carcinoma of the lung, peripheral type, with involvement of the pleura and the anterior chest wall possibly with involvement of the 5th and 6th ribs on the left side
- 2 Arteriosclerosis with calcification of the abdominal aorta and calcified aortic valve

#### PATHOLOGIC FINDINGS

D Ervonian Dr Sode gave an excellent analysis of the case and as we shall see reached the correct diagnosis

At the time of autopsy the body was that of an emaciated elderly white female appearing to be about 80 years of age There were no unusual features except those associated with her advanced age When the pleural cavities were opened about 3 000 ml of straw colored fluid was removed from the left pleural cavity The entire pleural surface of the left side was studded with myriads of small firm gray nodules measuring up to 4 mm in diameter Similar but fewer nodules were present on the pleura of the right side Within the pericardium there was about 200 ml of straw colored fluid and the entire left side of the pericardial sac was thickened fibrotic and firmly adherent to the visceral pleura of the left lung

The left lower lobe  
 It was a firm gray  
 gray and red. The  
 many small, gray nodu  
 in diameter. The em  
 scattered over the  
 and both main ster  
 The hilar lymph ne  
 later, when the stu  
 probably primary in  
 lobes, pleura and

is a  
 r r r  
 few  
 without  
 filled a  
 and ant  
 this was  
 ver lobe with



Figure 1 (A) Section of bronchiolar carcinoma from primary site in left lower lobe of the lung ( $\times 100$ ) (B) Higher magnification of tumor cells from same area ( $\times 430$ )

The other pathologic features were those associated with advanced age. These consisted of severe calcific  
 the thoracic and abdominal aorta atrophy of  
 polyps in the cecum and sigmoid colon sigmoid

as of pulmonary origin Doubt reported five cases of primary pleural epithelioma among over 500 000 admissions to the Henry Ford Hospital Sarcomas of the diaphragmatic structures are even rarer Statistically therefore the chances for pulmonary carcinoma are infinitely better Could this patient have had a metastatic pulmonary lesion? In a female metastases usually reach the lungs from primary malignant tumors in the thyroid breast gastro-intestinal tract or kidney Chorioepitheliomas can also metastasize to the lungs The right kidney was palpated in this patient at the time of the initial physical examination but no mass was seen in the right flank on a roentgenogram There is nothing in the protocol to implicate the other organs that commonly are sites of malignancies with pulmonary metastases although admittedly the patient's stay in the hospital was too short for adequate screening Primary carcinoma of the lungs therefore should be placed at the top of the list in the differential diagnosis It can mimic any other pulmonary disease It explains this patient's course symptoms and findings better than any other entity Pleural and later chest wall involvement explains why the patient's pain which at first was pleuritic persisted after the development of pleural effusion and became associated with local tenderness Chest wall involvement also explains why the patient sought relief by lying on the right side Pulmonary carcinoma fits the patient's age group better than does tuberculosis which admittedly cannot be definitely excluded

#### Dr Sode's diagnoses

- 1 Primary carcinoma of the lung peripheral type with involvement of the pleura and the anterior chest wall possibly with involvement of the 5th and 6th ribs on the left side
- 2 Arteriosclerosis with calcification of the abdominal aorta and calcified aortic valve

#### PATHOLOGIC FINDINGS

Dr Ervan on Dr Sode gave an excellent analysis of the case and as we shall see reached the correct diagnosis

At the time of autopsy the body was that of an emaciated elderly white female appearing to be about 80 years of age There were no unusual features except those associated with her advanced age When the pleural cavities were opened about 3 000 ml of straw colored fluid was removed from the left pleural cavity The entire pleural surface of the left side was studded with myriads of small firm gray nodules measuring up to 4 mm in diameter Similar but fewer nodules were present on the pleura of the right side Within the pericardium there was about 200 ml of straw colored fluid and the entire left side of the pericardial sac was thickened fibrotic and firmly adherent to the visceral pleura of the left lung

The left lower lobe of the lung was greatly retracted and shrunken. It was a firm, gray, consolidated mass, irregularly streaked with darker gray and red. The left upper lobe was also shrunken but it contained many small gray nodules measuring from 1 to 2 mm in diameter up to 1 cm in diameter. The entire right lung showed similar, small gray nodules scattered over the pleura and throughout the parenchyma. The trachea and both main stem bronchi were filled with thick, yellow exudate. The hilar lymph nodes were small and anfractuous. As we shall see later, when the slides are shown, this was a bronchiolar carcinoma probably primary in the left lower lobe with metastases to the other lobes, pleura, and hilar nodes.



Figure 1 (A) Section of bronchiolar carcinoma from primary site in left lower lobe of the lung ( $\times 100$ ) (B) Higher magnification of tumor cells from same area ( $\times 430$ )

The other pathologic features were those associated with the woman's advanced age. These consisted of severe calcific atherosclerosis in the thoracic and abdominal aorta, atrophy of the genitalia, multiple polyps in the cecum and sigmoid colon, sigmoid diverticuli, and giant



rugular folds in the stomach. The mass palpated in the right flank was actually a pyramidal shaped right lobe of the liver which extended down to the brim of the pelvis. The liver was only 1 110 grams in weight and was not unusual. A soft red polypoid elevation in the stomach 1 cm in diameter was present.

We will show some representative slides of the tumor and its metastases. The first section (fig 1A) is from the left lower lobe where we believe the primary was. As you can see the tumor takes glandular structures of varying sizes and shapes. The tumor epithelium is rather neat and resembles bronchial epithelium remarkably (fig 1B). In areas where the tumor has apparently been present a long time the tumor cells are in small clumps and are generally large pleomorphic and anaplastic (fig 2). In these areas there is a generous fibrous re-

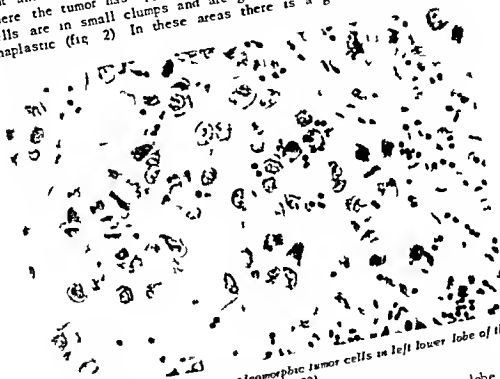


Figure 2. Clump of anaplastic pleomorphic tumor cells in left lower lobe of the lung (X 430)

sponse. In all of the sections of the right lung and left upper lobe the tumor radiated out from around blood vessels and bronchi, indicating that it probably arrived there via perivascular and peribronchial lymphatics.

Verastases were present in the pleura, hilar lymph nodes, pericardium, aorta, and diaphragm. In addition, the patient had acute tracheitis and bronchopneumonia. Other significant findings were chronic hypertrophic gastritis and adenomatous polyps of the stomach. Multiple adenomatous polyps were present in the colon, and there were multiple dermoid cysts adjacent to both fallopian tubes. The pituitary showed eosinophilia and a remnant of Rathke's pouch.

This is a rather typical case of bronchiolar or alveolar cell carcinoma of the lung. This tumor is said to constitute between three and four per cent of malignant tumors of the lung.<sup>1</sup> Dyspnea is usually the first symptom, and death is more often produced by local effect on the lung tissue than by metastases. The peripheral location, and usual failure to metastasize widely, despite massive involvement of both lungs distinguish this tumor from the bronchogenic carcinomas.

#### Pathologic diagnoses

- 1 Bronchiolar (alveolar cell) carcinoma of the left lower lobe
- 2 Metastases to both lungs, pleura, diaphragm, pericardium, hilar nodes, and aorta

#### REFERENCES

- 1 Friedberg C K *Diseases of the Heart* W B Saunders Co Philadelphia Pa 1949 pp 901-902
- 2 White P D August S and Michie C R Hydrothorax in congestive heart failure *Am J Med Sc* 214 243 247 Sept 1947
- 3 Rich A R *Pathogenesis of Tuberculosis* Charles C Thomas Publisher Springfield, Ill 1944
- 4 Pullen R L *Pulmonary Diseases* Lea & Febiger Philadelphia Pa 1955 pp 347 348
- 5 Doub H P Roentgen studies of the acic tumors *Pennsylvania M J* 51 968-975 June 1948.
- 6 Liebow A A *Tumors of the Lower Respiratory Tract* Section 4—Fascicle 17 of *Atlas of Tumor Pathology* Armed Forces Institute of Pathology Washington D C, 1957 pp 53 62

## SERVICE ARTICLES

# AN EFFECTIVE MOTOR VEHICLE ACCIDENT PREVENTION PROGRAM

GEORGE B RIBBLE *Captain MC USN*

THE average driver rolling down the highway in his car seems unaware of the mortal danger that may lie just ahead of him. While death rates per 100,000 miles have decreased since 1935, the magnitude of the slaughter keeps mounting because of the increased number of cars and the increased number of people exposed to potential accidents. The seriousness of the problem is shown by the fact that more lives have been lost through vehicular accidents than in all the wars the United States has fought since the Revolution—over one and one half million. Nor is the loss of life confined to adults who usually share some of the responsibility for their fate. In 1954 the automobile was responsible for about 2750 of the 6000 deaths caused by accidents among children from 5 to 14 years of age. In spite of the large number of lives lost from this cause, the public exhibits a strange apathy as compared with its concern over the common childhood diseases, which are less important as causes of death and disability.

Recently, general interest in the problem of automobile accident reduction has really increased, particularly in the medical and related professional groups. For example, in 1954 Chapman<sup>1</sup> emphasized the epidemiologic approach to traffic safety and Blasdell<sup>2</sup> called for a reappraisal of the problem in terms of human capacity with adoption of rigid driver training programs and more stringent highway regulations. Holland and Long reported that traffic accidents are the principal peacetime cause of death in the Army. In 1954 they accounted for 691 deaths, or nearly one third of the 2346 total for that year.

Sheloen<sup>3</sup> cited prevention as the only cure for head injuries from automobile accidents and pointed out that there were more deaths in 1953 from auto crashes than from all forms of poliomyelitis and tuberculosis combined. In emphasizing the responsibility of the medical profession he stated that if this Nation were confronted with an epidemic that took the lives of 38000 persons in one year and the medical profession did not recom-

trend steps to control the situation, there would be a congressional investigation

Dietrich<sup>4</sup> emphasized the necessity of early childhood training to develop an attitude of safety consciousness. He also recommended the teaching of accident prevention in medical schools, to instill in members of the profession a proper awareness of the threat to health presented by accidents. McInrland<sup>5</sup> stressed the human element in automobile accidents, calling attention to the interrelationship of the driver, his vehicle, and the environment. He recommended carefully controlled experimental studies, epidemiologic surveys, and statistical analysis, with dynamic and continuous safety programs producing positive results from such studies.

McGuire<sup>6</sup> contributed outstandingly to our knowledge of human factors in traffic accidents. He found that a disproportionate number of accidents involving Marine Corps personnel at Camp Lejeune, N. C., occurred in the lower ranks, which are usually made up of young men. He confirmed the suspicion that accidents frequently are precipitated by physical fatigue and abuse of alcohol, and usually are associated with traffic violations. He also indicated that drivers who do not have accidents comprise a special group who have respect for law and who come from a harmonious family environment. They are, in general, friendly and co-operative persons with temperate and socially acceptable attitudes. He advocated careful psychology examination of drivers to eliminate the unfit, and suggested that training programs be instituted to improve borderline individuals.

Interest in traffic safety has increased in the military services. In May 1954 the Commandant of the Marine Corps issued a directive<sup>7</sup> outlining a program for auto accident prevention at all Marine Corps activities. It calls for the organization of Safe Driving Councils at local commands to advise on the implementation of educational, enforcement, traffic engineering, and administrative control measures. Four hours of basic instruction under the supervision of local "Unit Vehicle Accident Prevention Officers" is required annually for Marine Corps personnel in the lower ranks. Operators of civilian as well as of military vehicles are included. The program is specifically directed to the prevention of accidents among military personnel, irrespective of their duty status.

In January 1956 the Bureau of Naval Personnel issued a similar instruction,<sup>8</sup> which applies to all naval activities. Thus, both branches of the naval service have extended the responsibility of local commanding officers to include the prevention of injuries and deaths from traffic accidents.

In a previous article,<sup>12</sup> I reported the value of a safe driving program at the Naval Air Station Memphis, Tenn., during the period 1951 to 1954. This station included several military activities with a total of about 10 000 personnel. A large proportion were young men who had left home only recently and were not fully accustomed to the lack of parental restraint. Most of these youngsters did not hesitate to gamble in traffic for a week end at home or a "liberty" in the Memphis vicinity. During my first year or board about 300 persons received major and minor injuries, and 15 were killed. As Medical Officer of the Station Dispensary I realized that my greatest challenge was to reduce the large toll of casualties from automobile accidents. The organization of a Safe Driving Council and the success obtained in reducing the annual toll has been described previously.<sup>12</sup>

When I arrived at this air station in May 1954, much interest in the traffic safety program was evident. Talks were being given and films on safe driving were being shown to small groups of men as part of the required four hours' annual basic instruction. A sound enforcement program was in effect and good general publicity and educational information were being disseminated via a local radio station and through the station newspaper, the *hindsuck*. An auto accident score board also was employed in attempting to reduce accidents among personnel.

A suggestion that a device be set up for the broadcasting of admonitions on safe driving to men leaving the base for leave or liberty was quickly accepted. This had proved to be of value at the Naval Air Station Memphis, Tenn. Its use on Fridays and the long holiday week ends has been continued as a regular part of the safe driving program. Display of an ambulance and a wrecked vehicle combined with verbal admonition, makes a dramatic and effective appeal to a man at the key moment of departure from the station.

Throughout the year 1955 every effort was made to implement General Order No 152.<sup>13</sup> Officers in charge of instruction were provided with a complete outline of education literature, such as speech kits, booklets, films, charts, and many other items used in carrying out the local program.

To efficiently implement the order and to immediately influence as many men as possible a general rally of about 4 000 low rated younger men was held in the station theater in March 1955. The attendees were told of the traffic danger on and off the station and were asked to co-operate by driving safely. This proved to be a simple and practical way to influence a large number of the most susceptible group. In September 1955 the policy was established of having a rally before each national

holiday or long week end During the national holiday periods of the year 1955, the auto accident toll of the station was at its lowest Figure 1 summarizes the record of the station for the major holiday leave periods

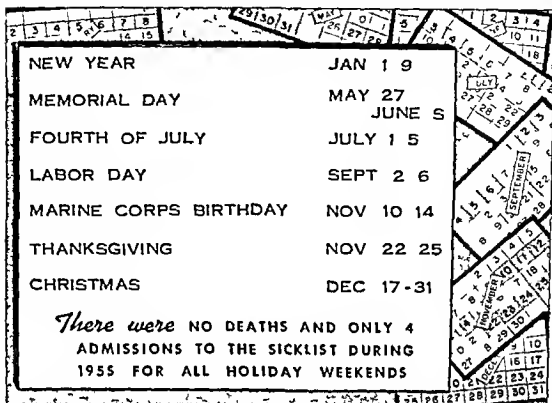


Figure 1 Low automobile accident toll during major holiday leave periods in 1955

Throughout 1955, pamphlets obtained from various automobile manufacturers and life insurance and casualty companies were distributed to the crew. In addition, a striking pictorial pamphlet with photographs of accident victims was prepared by local safety agencies. This was financed by the advertising of local merchants, and over 5,000 copies were distributed. Educational literature of this type was used to supplement weekly articles in the *Windsock*. Posters and other written material designed to bring about an improved attitude of driver safety consciousness helped to reinforce local command programs.

#### ACCIDENT FACTS

A pin map (fig. 2), showing where accidents had occurred during 1955, helped us to realize our problem. This map was posted in the Commanding General's weekly conference room. An analysis of the 1955 casualties (table 1) shows that the greatest number of accidents occurred in local area, but that distance driving resulted in more fatalities per accident. Analyses of injury and death rates for the various subcommands of the station

## ROLE OF THE MEDICAL OFFICER

In considering the role of the Medical Officer in motor vehicular accidents, prevention is the most important role. Figure 4 lists specific areas in which the Medical Officer can be used to aid various branches of the Safe Driving Council and adviser to the Commanding General on medical aspects of traffic accidents. The Medical Officer's knowledge of the problem gained through personal experience and statistical analysis is of great value in bringing attention to the importance of causative factors and to instill optimism and confidence.

### The Medical Officer—MEMBER SAFE DRIVING COUNCIL

Applies PRINCIPLES OF EPIDEMIOLOGICAL APPROACH TO PROBLEM OF AUTOMOBILE ACCIDENTS

Assembles STATISTICS ON INJURIES AND DEATHS

Studies CONTRIBUTING FACTORS SUCH AS ALCOHOL AND FATIGUE AND MAKES RECOMMENDATIONS

Helps ELIMINATE DRIVING WHILE DRINKING BY EXPEDITING MEDICAL EXAMINATION

Effects LIAISON WITH CIVILIAN RESEARCH PROGRAMS TAKES PART IN LOCAL COMMUNITY PROGRAMS

Assumes ROLE OF LEADERSHIP IN STIMULATING INTEREST AND ACTION ON CONTROL MEASURES

The Medical Officer in prevention of motor vehicle accidents brings into the participants in a program Conviction at the highest level defined as "command interest," has been found to be absolutely essential. It overcomes the inertia usually prevalent at lower levels of command from too long familiarity with and forced acceptance of the situation. As a member of the Safe Driving Council the Medical Officer's recommendation to the Commanding General possesses the benefit of the collective opinion of other council members and are more likely to withstand critical examination.

Experience at many military installations and at city, state, and national level has proved the beneficial effect of safety programs based on intensive efforts through the "three E's."

Education, Enforcement, and Traffic Engineering At military activities, we have another avenue, "Administration," which implies the power of military command to exercise certain control measures that are not practicable in a civilian community. Such programs, as outlined by the National Safety Council or by high military command, can usually be implemented in large portion by using personnel and facilities already present at the local activity. Thus, at minimum expense, savings of incalculable value may be obtained through intensive local programs. It is only necessary to convince responsible local authorities of the wisdom and promise of this course of action to ensure beneficial results. Injury from automobile accidents is a life and death matter, lying squarely in the province of the physician.

### SUMMARY

Injuries and deaths caused by motor vehicle accidents constitute a serious national and military problem that to date has not received its proportionate share of attention.

At a military base, an accident prevention program such as described herein can reduce injuries and deaths from motor vehicles at minimum cost, using facilities and personnel for the most part already available.

*The military medical officer has an important key to a successful reduction in casualties in his influence with the top echelon of command, whose support in implementation of a control program is an absolute essential.*

### REFERENCES

- 1 *Accident Facts* National Safety Council Chicago Ill 1955 p 6
- 2 Chapman A L Epidemiological approach to traffic safety *Pub Health Rep* 69 773-775 Aug 1954
- 3 Blaisdell P H Neglected element in highway safety *Pub Health Rep* 69 769-772 Aug 1954
- 4 Holland B D and Long A P Cost of non battle injuries and diseases as compared to battle casualties *Mil Med* 117 46-50 July 1955
- 5 Shelden C H Prevention only cure for head injuries resulting from automobile accidents *J A M A* 159 981-986 Nov 5 1955
- 6 Oettrich H F Prevention of childhood accidents what are we waiting for? *J A M A* 156 929-931 Nov 6 1954
- 7 McFarland R A Research in field of accidental trauma *Mil Med* 116 426-435 June 1955
- 8 McGuire F L Outline for new approach to problem of highway accidents *U S Armed Forces M J* 7 1157-1166 Aug 1956
- 9 McGuire F L Psychological comparison of automobile drivers accident and violation free versus accident violation-occurring drivers *U S Armed Forces M J* 7 1741-1748 Dec 1956
- 10 *Marine Corps Motor Vehicle Accident Prevention Program* Marine Corps General Order No 152 Headquarters U S Marine Corps 4 May 1954



11 BuP ts I ruct on 51012 Navy Traffic Safety Program for Off Duty Military Personnel  
 4 J n 1956  
 12 Ribble G B A d e l d p r m at particu uon in v hicular m t r a c c d nt  
 17 gr m Mrl Med 116 195-200 1 at 1955  
 13 Ribbl G B nd Mayo G D Automobile Safety Program. CNAATT P 201  
 Ch f f v l Air T ch c l Tr in ng V T l Air Station Memphis Tenn 25 Sept.  
 1953

# VITAMINS IN INFECTIONS

The influence of vitamin nutrition on resistance to specific infections in the human subject remains largely unknown. There is considerable evidence that infections and other stress situations influence the requirement or utilization of certain vitamins but there are few if any data regarding exact requirements in specific pathologic states. The therapeutic value of administration of large doses of vitamins in infections has not been appraised critically.

—GRACE A. GOLDSMITH M D  
 in New England Journal of Medicine  
 p 170 Jan 26 1956

# RIFLE-SLING PALSY IN MARINE CORPS RECRUITS

ERWIN L BURKE *Lieutenant MC USN*  
CLARENCE G GLENN *Lieutenant Commander MC USNR*  
JAMES F WALES *Lieutenant MC USNR*

THE condition of rifle sling palsy was brought to our attention by the simultaneous presence on the Neurology Ward at this hospital of five Marine Corps recruits with severe disability of the left hand and arm following use of the rifle sling in training. Ten additional recruits with this condition were treated at this activity in the past three years. As shown in table 1, the length of hospitalization is often prolonged.

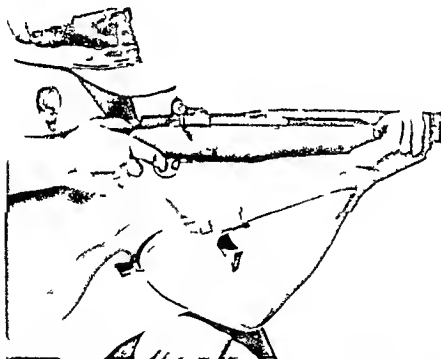


Figure 1 Rifle sling palsy is caused by the loop sling which is placed tightly about the left arm in the manner and position shown. The greatest pressure is exerted posteriorly and the least pressure is applied anteriorly by reason of traction upon the sling. This explains the involvement of the radial, ulnar, median, and musculocutaneous nerves in that order of frequency.

From U S Naval Hospital, San Diego, Calif. and Weapons Training Battalion, Marine Corps Recruit Depot, San Diego, Calif.

TABLE 1 Analysis of 15 cases of rifle shrapnel palsy admitted to this hospital in the past three years

Patient	Nerves involved	Hospital days	Duration of symptoms in days prior to hospitalization	Remarks
1	R dial	134	4	Recurrent after a previous admission of 159 days
2	Radial	30	5	
	ulnar	30		
3	Radial		21	
			5	Separated from service with concurrent convulsions
4	R dial	29	17	
5	R dial	33		
6	Radial	128		
	ulnar			
7	Radial	15	2	Admitted with diagnosis of poliomyelitis
	ulnar	205	4	
	median			
8	R dial			146 days of hospitalization at time of submission of this paper
9	R dial	181	14	
	ulnar			Separated from service with residual radial and ulnar palsy. This man had been previously treated at this hospital 18 days and returned to duty
10	Radial		14	
	ulnar			
	median			
11	R dial	94	1	
	ulnar	28	1	
12	R dial		10	
13	Radial	137		
	ulnar			
14	Radial	158		
	ulnar			
15	R dial		68	21
	ulnar			
	median			
	muco-cutaneous			



*Figure 2 The loop type sling is not used in the standing position. We believe that the "ready sling" shown is harmless. The rifleman pictured has the typical slender habitus most commonly seen in patients with this disorder.*

*Figure 3 This man had radial, ulnar, and median nerve palsy necessitating prolonged hospitalization. Note the wrist drop found in radial nerve palsy and the "lateral drift" of the little finger seen in ulnar nerve palsy.*

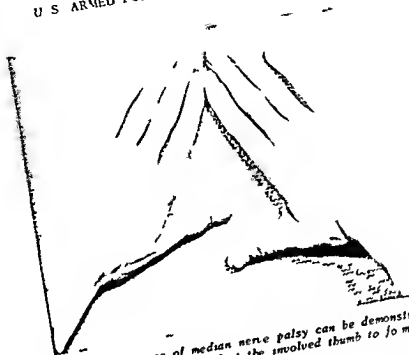


Figure 4. The presence of median nerve palsy can be demonstrated by the inability of the patient to adduct the involved thumb to form a bridge in the manner shown.



Figure 5. Areas of sensory loss seen in a case of radial and ulnar nerve palsy.

The above findings are contrasted with those of Muntz, Conrad, and Murchison,<sup>1</sup> who reported 18 cases of rifle sling palsy occurring in soldiers and found that the time for full recovery varied from 1 to 21 days, with a mean of 5.4 days. In our series, there was a mean of 96 days before full recovery or separation from service.

In order to obtain a reliable estimate of the frequency of occurrence of this condition a study of Marine Corps recruits finishing the prescribed course of rifle training exercises was carried out. The power of dorsiflexion of the wrist was used as a screening test, and where significant weakness was found a test of ulnar and median nerve function was also carried out.<sup>2</sup> Of 1,213 men who were screened, 97 (7.9 per cent) were found to have some nerve deficit. Seventy-nine had radial nerve involvement only, 17 had combined radial and ulnar nerve involvement, and 1 had radial, ulnar, and median nerve involvement. Eight of the 97 had sufficient disability to interfere with the performance of their duty. Two of these 8 had marked weakness of radial nerve function. At follow-up examination three weeks later the last two men were the only ones with significant remaining disability.

The difficulty of screening a large number of men in the manner described is that it is time consuming and admittedly subject to various errors. A more objective and practical approach could be utilized by having the drill instructors test the ability of groups of men finishing firing exercises to support the rifle by the sling with the wrist extended 180°, palm down. The average man can carry out this maneuver with ease. All subjects unable to do so could then be referred to the dispensary for examination by the medical officer.

We also believe that the drill instructors could profitably be made aware of this condition and could take steps to assure loosening of the sling after rifle firing exercises.

#### SUMMARY

In a study of 15 Marine Corps recruits hospitalized with severe rifle sling palsy, the duration of disability was found to be prolonged.

The screening of 1,213 men for rifle sling palsy following the prescribed course of rifle training exercises revealed some nerve deficit in 97 (7.9 per cent). There was sufficient disability to interfere with performance of duty in 8 (0.7 per cent), however all but two recovered within three weeks.

In the light of this and other studies we suggest that the "tourniquet" type rifle sling bears re-evaluation and should be used with at least the same precautions as a tourniquet.

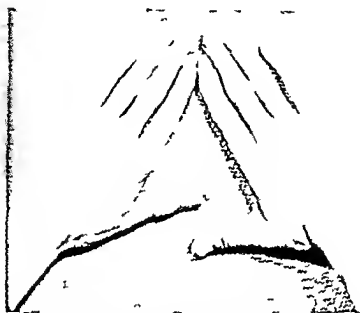


Figure 4. The presence of median nerve palsy can be demonstrated by the inability of the patient to abduct the involved thumb to form a bridge in the manner shown.



Figure 5. Areas of sensory loss seen in a case of radial and ulnar nerve palsy.

The above findings are contrasted with those of Muntz, Conrad, and Murchison,<sup>1</sup> who reported 18 cases of rifle sling palsy occurring in soldiers and found that the time for full recovery varied from 1 to 21 days, with a mean of 5.4 days. In our series, there was a mean of 96 days before full recovery or separation from service.

In order to obtain a reliable estimate of the frequency of occurrence of this condition a study of Marine Corps recruits finishing the prescribed course of rifle training exercises was carried out. The power of dorsiflexion of the wrist was used as a screening test, and where significant weakness was found a test of ulnar and median nerve function was also carried out.<sup>2</sup> Of 1,213 men who were screened, 97 (7.9 per cent) were found to have some nerve deficit. Seventy-nine had radial nerve involvement only, 17 had combined radial and ulnar nerve involvement, and 1 had radial, ulnar, and median nerve involvement. Eight of the 97 had sufficient disability to interfere with the performance of their duty. Two of these 8 had marked weakness of radial nerve function. At follow up examination three weeks later the last two men were the only ones with significant remaining disability.

The difficulty of screening a large number of men in the manner described is that it is time consuming and admittedly subject to various errors. A more objective and practical approach could be utilized by having the drill instructors test the ability of groups of men finishing firing exercises to support the rifle by the sling with the wrist extended 180°, palm down. The average man can carry out this maneuver with ease. All subjects unable to do so could then be referred to the dispensary for examination by the medical officer.

We also believe that the drill instructors could profitably be made aware of this condition and could take steps to assure loosening of the sling after rifle firing exercises.

#### SUMMARY

In a study of 15 Marine Corps recruits hospitalized with severe rifle sling palsy, the duration of disability was found to be prolonged.

The screening of 1,213 men for rifle sling palsy following the prescribed course of rifle training exercises revealed some nerve deficit in 97 (7.9 per cent). There was sufficient disability to interfere with performance of duty in 8 (0.7 per cent), however all but two recovered within three weeks.

In the light of this and other studies we suggest that the "tourniquet" type rifle sling bears reevaluation and should be used with at least the same precautions as a tourniquet.



---

**ACKNOWLEDGMENT** The authors wish to express their appreciation to Captain Robert L. Wagner AC USA for his assistance in the preparation of this article

#### REFERENCES

- 1 Muntz H. H., Coontz R. W. and Metchison R. A. Rifle-ling p. 159 *U S Armed Forces M. J.* 6, 353-358, Mar 1955
  - 2 Haymaker W. and Woodhall B. *Peripheral Nerve Injuries* Principle of Diagnosis 2d edition. W B Saunders Co. Philad I lsa Pa 1953 pp. 58-64
- 

The population of the United States has been increasing steadily and is expected to continue its vigorous growth in the next two decades. Since the last census was taken five years ago our population including the Armed Forces overseas has increased by approximately 13<sup>1</sup>/<sub>2</sub> million and now totals more than 164<sup>1</sup>/<sub>2</sub> million. If the birth rate continues at its present high level the population of our country will pass the 200 million mark before 1970 and will exceed 220 million by 1975. Such increase in the next 20 years would be equal to the gain in the preceding third of a century.

—Statistical Bulletin,  
Metropolitan Life Insurance Company  
p. 6 Mar 1955

# ARMY AEROMEDICAL EVACUATION

THOMAS N PAGE, *Colonel MC USA*

SPURGEON H NEFL *Lieutenant Colonel MC USA*

**T**ODAY, the United States Army is in a state of revolutionary change. With the advent of new weapons systems, including delivery of nuclear weapons in both the kiloton and megaton range by a variety of means, it is apparent that the Army of the future, if it is to survive (much less accomplish its mission) on the battlefield of the future, must undergo radical changes in organization, dispositions, and employment. New concepts are based essentially on two inescapable facts. Enemy capabilities for the employment of mass destruction weapons dictate that the Army of the future must be capable of increased dispersion and possess the organic mobility to mass for attack at points of decision and then disperse again to avoid annihilation. This situation establishes a requirement for increased use of organic Army aviation, not only to facilitate tactical mobility, but also to increase the capability, efficiency, and responsiveness of logistic support, including medical evacuation. The following represents the considered opinion of the Surgeon General of the Army with respect to the subject of Army aeromedical evacuation.

## ARMY AEROMEDICAL EVACUATION

A brief review of the historical development of Army aeromedical evacuation will assist in the understanding of the current concept. The Army has long recognized the advantages of aeromedical evacuation, but until recently has not had available aircraft in sufficient numbers for its exploitation in the forward combat area. The feasibility and full advantages of aeromedical evacuation by high performance, fixed wing aircraft became apparent early in World War II. Immediately after that conflict, aerial evacuation was designated as the primary means for moving patients to the rear of the combat zone. This mission has been most effectively accomplished by U S Air Force troop carrier elements within overseas theaters, and by the Military Air Transport Service between theaters and within the continental United States. Pending development of the helicopter and the assault type aircraft there remained,

---

From the Office of the Surgeon General Department of the Army Washington O C

however, little capability for the forward aeromedical evacuation function.

In Korea circumstances demanded that the advantages of aerial evacuation be extended into the most forward combat area. The paucity and disposition of Army treatment facilities, the nature of the terrain, the type of combat, and the extremely limited surface communications net all combined to establish an urgent requirement for a rapid, atraumatic, dependable means for moving casualties from forward medical facilities to Army hospitals capable of providing definitive lifesaving surgery. These considerations, plus the acceptance of the helicopter as an organic vehicle of the Army, permitted the fulfillment of an old concept of the Army Medical Service.<sup>1</sup>

Shortly after the outbreak of hostilities in Korea, a helicopter detachment of the Third Air Rescue Squadron began to receive requests from ground elements for the evacuation of casualties from difficult terrain. Inasmuch as this detachment was not fully occupied with its primary mission, it responded to these calls. By August 1950 this U. S. Air Force unit was answering so many calls that it found itself in the medical evacuation business.

Quick to note the advantages of helicopter evacuation in terrain such as Korea, the Eighth Army developed an increased interest in the program. After a significant test conducted by Army and Air Force representatives on 3 August 1950 in the school yard of the Taeju Teachers College, Army helicopters were adopted for the evacuation of casualties and the first procedures were established. In January 1951 the first Army helicopter detachment with a primary mission of medical evacuation became operational, followed in rapid succession by two others.

These nonmedical units were assigned to the Eighth Army Flight Detachment, were attached to forward surgical hospitals, and were under the dispatch/operational control of corps surgeons. In August 1952 the Department of the Army authorized the "helicopter ambulance unit," a T O & E (Tables of Organization and Equipment) organization derived from the Korean experience. In December 1952 the operating helicopter evacuation detachments in Korea were redesignated as "medical detachments helicopter ambulance" and became medical units for the first time.<sup>2</sup> During this period similar detachments were activated within the continental United States and some dispatched to the Seventh Army in Europe.

With only minor changes, the medical helicopter ambulance detachment of today (of which there are 11) is almost identical with that authorized in 1952. In the near future it is expected that a "Medical Aerial Ambulance Company" will be authorized.

for the forward aeromedical evacuation mission. This unit, equipped with utility helicopters, will be allocated to the field army to supplement current helicopter ambulance detachments. It is believed that considerable operational, administrative and logistic advantages will accrue from the company type organization.

This rather brief historical account brings us to current Army Medical Service doctrine pertaining to forward aeromedical evacuation. These doctrinal statements have been developed after thorough evaluation of experience data, current doctrine and procedures in the light of what is known of warfare of the future.

*Aeromedical evacuation within the combat zone is an accepted mission and capability of organic Army aviation.* The "Memorandum of Understanding relating to Army Organic Aviation" between the Secretaries of the Army and the Air Force, dated 4 November 1952, states that the Army will provide "aeromedical evacuation within the combat zone, to include battlefield pickup of casualties, their air transport to initial points of treatment and any subsequent move to hospital facilities within the combat zone." The medical evacuation mission of Army aviation was recently affirmed by the Secretary of Defense.

*Warfare of the future will be characterized by an increased use of organic Army aviation for both emergency and routine aeromedical evacuation within the combat zone.* This is in consonance with the increased dispersion of tactical and logistic support units and the increased dependence upon aerial lines of communications.

*Within the Army, the Army Medical Service has the basic technical responsibility for all medical evacuation, whether by surface or aerial means.* In order to ensure selectivity of evacuation and timeliness of treatment, the medical service must retain control over all evacuation, to include as a minimum the designation of patients to be moved, forward pickup sites, destination hospitals, and the provision of medical attendants and equipment.

*The current concept for accomplishing the Army aeromedical evacuation mission (i.e., emergency evacuation of seriously wounded by organic medical aircraft, and support by nonmedical aviation elements upon the request and under the jurisdiction of the medical service) is more desirable than certain previously proposed concepts of elimination of organic medical aviation, making all aeromedical evacuation the exclusive mission of nonmedical Army aviation units.* Specifically, the proposed concepts (1) place the welfare of patients secondary to other logistic considerations and missions, which is contrary to the national philosophy and detrimental to individual and unit morale, (2) lack responsiveness to emergency evacuation requirements,

(3) reduce medical control over the movement of patients, which reduces selectivity in evacuation, delays ultimate treatment and leads to overevacuation, depleting combat strength, (4) preclude most effective utilization of critical medical means including professional specialists and available hospital support, (5) fail to provide adequate property exchange concurrent with evacuation, reducing the continued capability of forward mobile medical treatment facilities, and (6) require diversion of logistic and tactical aircraft to missions for which they may not be designed or configured reducing the effectiveness of over all Army aviation support.

*The Army Medical Service requires sufficient organic aviation of the proper type to enable it to accomplish its continuing mission of rapid evacuation of the severely wounded directly to appropriate medical treatment facilities.* Ambulance aircraft should not be special purpose from the design or procurement standpoint but should be single purpose in the operational sense that they will not be used for any but medical missions. Ambulance aircraft should be marked with Geneva Red Crosses and should be manned with medical crews, including pilots, to afford additional protection to patients and to medical facilities where they may land. This provision of single purpose ambulance aircraft is considered no more uneconomical than the provision of fire fighting trucks and field ambulances, by the Army, or air and sea rescue aircraft by the Air Force and Navy.

*In the future both fixed and rotary wing ambulance aircraft will be required for the combat zone aeromedical evacuation mission due to the increased dispersion of tactical formations and supporting medical treatment facilities and the need for maximum flexibility, reliability and selectivity in medical evacuation.*

*Ambulance helicopters are required for the forward pickup of casualties and their transportation to initial points of treatment and to hospitals capable of resuscitative surgery.* Such helicopters should possess a small silhouette be capable of transporting two litter patients and one medical attendant internally and capable of flight under marginal weather conditions. The Bell AH 40 helicopter which should be available soon is well suited for this mission. Pending the availability of an adequate utility helicopter it is believed that a combination of the capabilities of current reconnaissance and utility helicopters will minimize the limitations of each type aircraft.

*Ambulance airplanes are required primarily for the longer lateral and rearward movement of patients needing special surgical treatment that may not be available in every forward hospital or to bypass intermediate hospitals with long surgical lags.* In addition they improve the flexibility and selectivity as well as the economy

and reliability of all forward aeromedical evacuation. The increased speed, range, and stability of fixed wing aircraft, their reduced initial and maintenance cost, and reduced sensitivity to wind velocity and differential more than compensate for their increased landing site requirements and their relative sensitivity to ceiling and visibility minimums. Such utility aircraft would operate from landing strips already prepared for other tactical and logistic purposes.

*The company type organization for the aeromedical evacuation function is superior to the current cellular detachment concept. Characteristics inherent to Army aircraft permit centralized command control, and considerable administrative, logistic and operational advantages may be achieved.*

*Medical air evacuation units, either fixed or rotary wing, should be assigned to the field army, to permit full exploitation of their capabilities and to facilitate shifting of evacuation support to meet actual requirements. Attachment to major subordinate commands should be limited to isolated or independent operations when centralized control of evacuation is infeasible.*

*The current procedure for requesting emergency aeromedical evacuation missions is adequate, but electronic means need considerable improvement to increase their reliability. The consensus is that there is no real requirement for a separate communications net for the control of aeromedical evacuation. The use of common electronic means is more economical, and other than medical agencies are involved in and should know about medical evacuation missions.*

*The Army Medical Service does not require sufficient organic aviation for the entire Army aeromedical evacuation mission. The movement of nonemergency patients by air can be accomplished economically by making use of utility and cargo aircraft in conjunction with normal logistic missions, provided there is adequate medical control over the movement of patients. To the extent feasible, all Army aircraft should be designed so as to be capable of transporting patients when required and upon the request of the medical service. Aeromedical evacuation should be retained as a secondary capability and mission of appropriate Army aviation units, to provide economical aerial movement of non-emergency patients when surface evacuation means are nonexistent or inadequate.*

*The Army Medical Service must maintain jurisdiction over all Army aeromedical evacuation, regardless of the category of the patient or the source of the aircraft. This does not imply actual medical control of nonmedical aircraft, but does include such matters as the designation of forward pickup sites and rearward destinations, provision of necessary medical personnel and equipment, and surveillance of casualties in flight. All movement of*

patients must be planned, programmed and controlled. Beebe and DeBakey stated "Nonselective evacuation of battle casualties undertaken for bed clearance measured by transport capacity, timed by transport availability and followed by distribution to hospitals based on bed credits, invites wound complications, retards recovery, and prevents return to duty."<sup>1</sup>

The selectivity which is inherent to Army aeromedical evacuation must be emphasized. This characteristic is less appreciated than the more obvious advantages of speed, range, and flexibility. Actually it is a function of these three factors. With adequate medical control of forward aeromedical evacuation the individual casualty is no longer "doomed" to evacuation to that particular hospital which happens to be in support of his unit. He may now be moved rapidly and safely to that hospital facility best staffed, equipped and situated for the care of his particular type of wound. This in effect places specialized surgical treatment in direct support of every forward surgeon.

This selectivity further promotes the effectiveness and economy of forward medical service. Specialist personnel may now be concentrated in designated facilities, and there is no requirement for staffing each hospital for the care of every type of patient. Surgical lags may be minimized and the patient loads equalized among available hospitals. The capabilities of forward treatment facilities are preserved by effective property exchange. The mobility of forward medical facilities is improved by the existence of a means for rapid atraumatic evacuation of large numbers of patients, permitting such units to displace without leaving large holding detachments.

#### REFERENCES

1. Neel, S. H., Jr. Medical considerations a helicopter evacuation. *U S Armed Forces M. J.* 5: 220-227, Feb. 1954.
2. Neel, S. H., Jr. Helicopter evacuation in Korea. *U S Armed Forces M. J.* 6: 691-702, May 1955.
3. Beebe, G. W., and DeBakey, M. E. *Battle Casualties*. Charles C. Thomas, Publisher, Springfield, Ill., 1952, p. 257.

# AUTHORITARIAN ATTITUDES AND ADJUSTMENT IN A MILITARY SITUATION

FRANCIS M. CANTLER *Captain USC USA*  
ANNE N. CANTLER *B. A.*

IT IS AN operating assumption that certain general attitudinal dispositions contribute to the effectiveness of individual adjustment to various life situations. One situation of particular interest, if only because nearly everyone at one time or another must make an adjustment to it, is the military situation. Although the military situation encompasses a wide range of specific "environments," one prevailing characteristic is its definite and rigid structuring, clear and known level and degrees of authority, and a body of rules and regulations governing nearly every aspect of living, with its demands on the individual clearly set forth.

One particular attitudinal disposition which might be related to the effectiveness of adjustment to this structured military situation is the so-called "authoritarian" attitude. The "authoritarian" individual has been described as one who is most comfortable in closely structured situations with strong central authority figures, continual ordering of all aspects of life, et cetera. In addition, there have been a number of other, more or less uncomplimentary, characteristics attributed to these individuals, e.g., Frenkel-Brunswik's<sup>1</sup> conclusion that authoritarians are inflexible, repressing, insecure, essentially anxious and possess other tendencies suggesting emotional instability if not outright neurosis. Much previous research in this area is conflicting with respect to the relationship between authoritarian attitudes and adjustment. Minsling<sup>2</sup> concluded that there is no direct relationship between authoritarianism and mental health. Siegel<sup>3</sup> found a positive relationship between authoritarianism and a measure of anxiety, while Stotsky,<sup>4</sup> using the same instruments, found a negative relationship.

While authoritarianism in the sense described above is not merely the same thing as "attitude toward authority," many of the same attitudinal dispositions are probably involved. The question arose as to what, if any, relationship authoritarian attitudes might bear to actual adjustment to such an "authority" situation as the military one.

---

From Landstuhl Army Hospital, Landstuhl, Germany. Capt. C  
to Brooke Army Hospital, Fort Sam Houston, Tex.





### Adjusted Group

*Normal group (A)* This group was composed of 271 enlisted soldiers who were operating personnel of a large Army general hospital. It was an unselected group in the sense that it represented all of the available personnel of the hospital who could be obtained for the study, and they were not volunteers in any sense other than in agreeing to cooperate in the completion of the questionnaire instrument.

The delinquent group and the normal group were drawn from the same parent population, i. e., personnel of a large, medical post "Service" troops (i. e., Medical, Signal, Transportation, Quartermaster, et cetera) composed 76 per cent of the psychiatric patient group and "line" troops (Infantry, Artillery, et cetera), 24 per cent. Among the service troops in this patient group, six were Air Force personnel, there were no Air Force personnel in the other groups. The proportions of U. S. (Selective Service) versus R. A. (Regular Army) are approximately the same in each group (10 per cent of the delinquent group, 38 per cent of the patient group, and 15 per cent of the normal group, were "U. S." personnel).

The test used in the study was the California F Scale, developed and described by Adorno and associates and is composed of the 29 items presented as Forms 45 and 10 in "The Authoritarian Personality."

The subjects in group N completed the scale in group sessions. They were asked to cooperate in a research study, and were assured of anonymity, but were requested to state age, years of education, length of service, military rank, and whether they were U. S. or R. A.

The subjects in group D completed the scale in individual sessions. They were asked to assist in gathering information on items of general interest and were assured that the results would have no bearing on their trial, nor could the results be introduced as evidence in any way.

The subjects in group P completed the scale in individual sessions as part of a psychological testing procedure. Assurance as to anonymity was not given in the same way as to the other two groups because of the special conditions of psychiatric evaluation, but subjects were assured that the results of the study would be medically confidential.

The composition of the three groups with regard to age, education, length of service and military rank is presented in table 1. There is no statistically significant difference between means on any of the variables, and the groups are therefore comparable in these respects.

This article is a report of an investigation of authoritarian attitudes in certain military groups with differing types of adjustment to the military situation. Assuming that authoritarianism represents a fairly basic attitudinal disposition, the finding of a relationship between this attitude and military adjustment could point the way toward further investigation with the eventual hope of identifying specific predictive factors.

### MATERIAL AND METHOD

Two general types of "maladjustment" were selected for study. One group represented maladjustment in the sense of overt rebellion or disregard of the military rules *i e* individuals in disciplinary difficulties. Another group represented maladjustment in the sense of disturbed inner adjustment not manifested by overt rebellion *i e*, individuals with certain psychiatric disorders. A third, normative group represented individuals who were functioning adequately and with no known maladjustment.

#### Maladjusted Groups

*Delinquent group (D)* This group was composed of 50 enlisted soldiers who were convicted by special court martial proceedings of a variety of offenses ranging from AWOL to aggravated assault with many instances of insubordination, disregard of orders *et cetera*. Most of these soldiers were second and third time offenders. There were no instances of very serious offenses such as burglary, homicide, *et cetera*. Many of the offenses were of a strictly military nature. This delinquent group is probably not comparable to a civilian "criminal" group or even to civilian delinquent groups except for certain cases. Many of the offenses in this group would not be legal offenses in a civilian setting *e g* absent without leave, insubordination to an authority figure, disregard of orders *et cetera* though the individuals would probably be equally maladjusted.

*Psychiatric patient group (P)* This group consisted of 100 enlisted soldiers who were seen in psychiatric consultation. These patients were characterized by a variety of diagnoses in the general categories of psychoneurosis or character disorder. All patients diagnosed as psychotic, all those in whom there was a question of neurological involvement, and all who were being evaluated pending court martial or other disciplinary action were omitted. The great majority of the patients had never had disciplinary action of any sort and most important, in no case was the psychiatric evaluation requested because of or related to delinquent behavior. In each of the 100 patients, anxiety was mentioned as one of the most prominent features. In most instances, special difficulties in adjusting to one aspect or another of military life were also mentioned *e g* difficulty in accepting discipline, forced separation from family, dislike of military assignment, *et cetera*.

F Scale score. In none of the groups is there a statistically significant difference between Selective Service and Regular Army troops in total F Scale score.

The distribution of the normal group was relatively symmetrical and somewhat platykurtic. The distribution of the patient scores was markedly skewed, with the low score end of the distribution missing. Distribution of delinquent scores was symmetrical but very platykurtic.

Product moment correlations between total F scale scores and educational level are, for the normal group, 0.11, for the delinquent group, 0.03, and for the patient group, 0.12. These correlations are statistically significant in the case of both patient groups. In the normal group, correlation with age is 0.11, with length of service, 0.15, and with rank, 0.07. The correlation with length of service is significant at 0.01 level of significance. Perhaps the most interesting feature of these correlations is not that there are some statistically significant ones, but that the relationships are so very small, in view of what has been written about the relationship of F Scale responses to intelligence, education, status, environmental influence, et cetera.

In general, there is evidence of a definite relationship between authoritarianism as reflected in F Scale responses, and the type of adjustment manifested by the groups studied, with the greatest difference found between the delinquent and the neurotic types of maladjustment.

The finding of high authoritarian attitudes in the patient group is not an unexpected finding in view of past descriptions of the authoritarian individual as an essentially neurotic person. However, the delinquent group is an equally neurotic group in terms of their inadequate adjustment to the realistic life situation in which they find themselves. Hence there seems to be an attitudinal parallel to the real difference between expressions of tensions in overt antiauthority actions and developing anxiety or psychosomatic symptoms.

One possible clue to this difference is a recent study by Bass,<sup>6</sup> who concluded that acquiescence or compliance accounts in large part for the direction and degree of F Scale responses. If it is true that the F Scale measures compliance rather than authoritarianism, the results obtained in the present study indicate that the normal group is a moderately compliant group, the patient group extremely compliant, and the delinquent group a rather uncompliant one, results which certainly reflect the adjustment situation. An authoritarian attitude (or even a lack of moderate degree) could mean ability to be dominated rather than be broken by it, regarded as neurotic, except where it is

TABLE 1 Age education length of military service and rank of subjects in the delinquent psychiatric patient and normal groups

	Group		
	Normal	Patient	Delinquent
Number of subjects	274	100	50
Age (years)			
Mean	26.86	25.38	23.96
Standard deviation	7.36	6.56	5.16
Education (years)			
Mean	11.91	11.64	11.36
Standard deviation	4.50	1.92	1.29
Service (months)			
Mean	65.00	44.58	31.54
Standard deviation	59.98	41.97	23.66
Rank			
Mean	2.83	2.52	1.92
Standard deviation	1.50	1.37	1.06

Lowest enlisted grade (Private) 1 and highest enlisted grade (Master Sergeant) 6

## RESULTS AND DISCUSSION

In table 2 are presented the mean scores of each group with the standard deviation and range of scores obtained. These data were subjected to a simple two part analysis of variance which yielded an F ratio of 19.168. This ratio is significant beyond the 0.01 level of confidence.

TABLE 2 Total item scores attained on California F Scale by normal psychiatric patient and delinquent group

Group	Number of subjects	Range	Mean	Standard deviation
Normal	274	39-194	128.58	31.34
Patient	100	96-184	140.62	18.44
Delinquent	50	62-161	111.20	19.48

The results in table 2 are in terms of total item scores (29 items). In terms of mean item scores the means would be normal group 4.43, patient group 4.86, and delinquent group 3.83. In the patient group there was no statistically significant difference between "line" and "service" troops in terms of total

F Scale score. In none of the groups is there a statistically significant difference between Selective Service and Regular Army troops in total I Scale score.

The distribution of the normal group was relatively symmetrical and somewhat platykurtic. The distribution of the patient scores was markedly skewed, with the low score end of the distribution missing. Distribution of delinquent scores was symmetrical but very platykurtic.

Product moment correlations between total I Scale score and educational level are, for the normal group,  $-0.27$ , for the delinquent group,  $0.03$ , and for the patient group,  $-0.28$ . These correlations are statistically significant in the normal and patient groups. In the normal group, correlation with age is  $0.11$ , with length of service,  $0.15$ , and with rank,  $0.07$ . The correlation with length of service is significant at  $0.05$  level of confidence. Perhaps the most interesting feature of these correlations is not that there are some statistically significant ones, but that the relationships are so very small, in view of what has been written about the relationship of I Scale responses to intelligence, education, status, environmental influence, et cetera.

In general, there is evidence of a definite relationship between authoritarianism as reflected in F-Scale responses, and the type of adjustment manifested by the groups studied, with the greatest difference found between the delinquent and the neurotic types of maladjustment.

The finding of high authoritarian attitudes in the patient group is not an unexpected finding in view of past descriptions of the authoritarian individual as an essentially neurotic person. However, the delinquent group is an equally neurotic group in terms of their inadequate adjustment to the realistic life situation in which they find themselves. Hence there seems to be an attitudinal parallel to the real difference between expressing of tensions in overt antiauthority actions and developing anxiety or psychosomatic symptoms.

One possible clue to this difference is a recent study by Bass,<sup>4</sup> who concluded that acquiescence or compliance accounts in large part for the direction and degree of F Scale responses. If it is true that the F Scale measures compliance rather than authoritarianism, the results obtained in the present study indicate that the normal group is a moderately compliant group, the patient group extremely compliant, and the delinquent group a rather uncompliant one, results which certainly parallel the adjustmental situation. An authoritarian attitude (or compliance) of moderate degree could mean ability to bend with the inescapable wind rather than be broken by it, and could hardly be regarded as neurotic, except where it is overdone or accompanied

by indications of basic conflict (as in the patient group) The results obtained here are consistent with Frenkel Brunswik's<sup>1</sup> discussion of the nonlinear relationships between authoritarian (F scale) attitudes and mental health particularly with respect to the so called principle of opposites

Another aspect of the present study requires discussion because of the considerable evidence that the situation exerts a determining influence on the response to questionnaires The normal group was the only one in which the individuals were absolutely certain of anonymity Since the delinquent individuals were in the highly uncomfortable position of being accused one might expect on this basis alone that they would agree with all items particularly those relating to acceptance of authority for safety's sake The normal group being completely anonymous could criticize authority as much as they liked As a matter of fact all groups were almost identical in agreeing to such items as "Obedience and respect for authority are the most important virtues children should learn" the mean item scores being 6.04 6.12 and 6.91

The differences between groups were found on the less obvious items and therefore it would seem that the lack of anonymity in the two maladjusted groups did not exercise a determining influence in terms merely of an attempt to figure out what the tester wanted or what would "look best" A possible explanation is that the items relating to respecting authority loving one's parents above all et cetera are answered simply as stereotypes by most people with little actual thought because these are conventional and acceptable sentiments whereas on the less reasonable sounding items critical faculties or resistances come into play For example the delinquent group agreed much less than the patient group that one learns only by suffering that people are either weak or strong that our lives are controlled by plots that we must take special precautions against infection by others et cetera Perhaps the patient group members in their efforts to deal with their own disturbing rebellious tendencies simply suspend critical faculties at this "action" level almost completely whereas the delinquent group members mobilize their critical or resistive faculties perhaps too readily on anything not completely congruent with habitual thinking or action

The results obtained in this study have implications not only for medical psychiatric evaluation of maladjusted individuals but suggest a possible line of investigation for military selection Cross validation and replication with other groups is certainly indicated as well as analysis of the aspects of the authoritarian complex which seem to be most relevant to the problem of adjustment to the military situation It is a question as to whether

the authoritarian attitudes are present in the various individuals before entry into military service and hence could furnish a possible clue to their adjustment or maladjustment and to the type of maladjustment, or whether the authoritarian attitudes obtained are themselves developments of more basic and unidentified personality factors and perhaps do not appear until the military experiences mobilize the particular form of adjustment.

### SUMMARY

An exploratory population study on two "maladjusted" groups and one "adjusted" military group was undertaken in order to determine possible relationships between authoritarian attitudes and adjustment in the military situation. California I Scale scores were obtained on a group of delinquent soldiers, a group of psychiatric patient soldiers, and a group of normal, adequately functioning soldiers. Mean scores were significantly different between all groups, the patient group scoring highest, the delinquent group lowest, and the normal group in between. These results are discussed in relation to possible attitudes of compliance or acquiescence and the implications of such attitudes for adjustment, as well as suggesting a line of future investigation with potentiality for use in military selection procedures.

---

**ACKNOWLEDGMENT** The authors gratefully acknowledge the assistance of Dr. David Rosenberg in collection and analysis of data and in stimulating discussion of the results.

### REFERENCES

1. Frenkel-Brunswick, E. Social research and problem of values: a reply. *J. Abnorm. & Social Psychol.* 49: 466-471, July 1954.
2. Masling, J. M. How neurotic is the authoritarian? *J. Abnorm. & Social Psychol.* 49: 316-318, Apr. 1954.
3. Siegel, S. Certain determinants and correlates of authoritarianism. *Genet. Psychol. Monogr.* 49: 187-229, May 1954.
4. Stotsky, B. A. Authoritarian personality as a stereotype. *J. Psychol.* 39: 325-328, Apr. 1955.
5. Adorno, T. W., Frenkel-Brunswick, E., Levinson, D. J., and Sanford, R. N. *The Authoritarian Personality*. Harper & Brothers, New York, N. Y., 1950.
6. Bass, B. M. Authoritarianism or acquiescence? *J. Abnorm. & Social Psychol.* 51: 616-623, Nov. 1955.



# CASE REPORTS

## Two Unusual Traumatic Dislocations

HAROLD M BRDDEE *Captain USAF (MC)*

**W**ITHIN a brief time interval, both a retrosternal dislocation of the clavicle and a subtalar dislocation of the foot were encountered at this hospital. Each of these interesting traumatic conditions occurs in less than 0.5 per cent of all dislocations.<sup>1,2</sup> This report includes a presentation and discussion of the above mentioned cases.

### CASE REPORTS

**Case 1** On 26 July 1956 a 20 year-old airman was thrown from an automobile and landed on the point of his left shoulder. He felt immediate burning and numbness in the region of the sternoclavicular joint. Shortly thereafter when an attendant inadvertently pulled the patient's left arm to turn him numbness occurred in the left hand. On admission to the hospital a few hours later his left shoulder was held in a shrugged position. Tenderness was present over the sternoclavicular joint area and a depression existed where the prominence of the medial end of the clavicle is normally found. When the shoulder was brought forward he complained of inability to breathe due to pressure on the trachea. Pulses and sensation in the left upper extremity were normal although subjective numbness was present in the hand. Roentgenograms revealed retrosternal displacement of the clavicle (fig. 1). Approximately six hours after the injury closed reduction was attempted under local anesthesia. Twenty milliliters of 1 per cent Xylocaine Hydrochloride (brand of lidocaine hydrochloride) was injected into the dislocation hematoma. With an assistant pulling outward on the arm direct lateral traction was applied to the clavicle by hooking the thumb and index finger about its midportion. The medial end of the clavicle returned to its normal position with a crunch. Roentgenograms revealed satisfactory reduction (fig. 2). A plaster yolk support was maintained for five weeks. The patient was involved in a brawl while on his first week-end pass without recurrence. He was returned to full duty 24 September asymptomatic and with full range of motion at the left shoulder. A check roentgenogram prior to discharge demonstrated normal position of the sternoclavicular joints (fig. 3).

---

From U. S. Air Force Hospital Park Air Force Base, Cliff Dr. Brddee now at 3400 Spruce Street Philadelphia, Pa.



Figure 1 (case 1) Right oblique view of sternoclavicular joints before reduction showing (A) sternal end of left clavicle behind the sternum (B) small oval bony fragment (source not apparent) and (C) sternal end of right clavicle. Figure 2 (case 1) Right oblique view immediately after reduction.



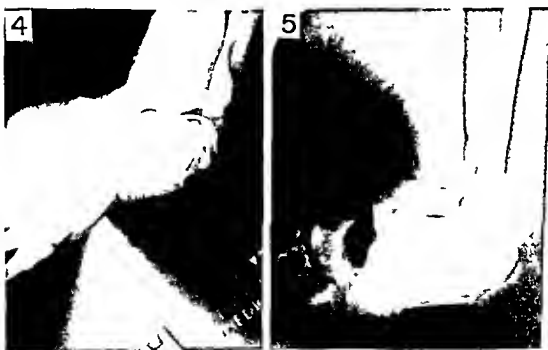
*Figure 3 (case 1) Anteroposterior view of sternoclavicular joints at time of hospital discharge demonstrative normal position of sternal end of clavicles. Small avulsed bony fragment is no longer discernible.*

**Discussion** Stability of the sternoclavicular joint under ordinary circumstances is assured chiefly by the capsular apparatus containing the anterior and posterior sternoclavicular ligaments and the rhomboid (costoclavicular) ligament. The latter particularly limits upward excursion of the sternal end of the clavicle. The tendinous attachments of the sternomastoid in front, the sternohyoid and sternothyroid behind and the subclavius muscle belly below afford additional reinforcement. While suprasternal, presternal and retrosternal dislocations may occur the latter is the least common and potentially the most dangerous.

The dislocation may result from force applied indirectly, as in a fall on the point of the shoulder<sup>1,2</sup> or directly, as from a rule kick<sup>3</sup> or blow from a rifle butt. Experiments on cadavers have demonstrated how the first rib protects against posterior dislocation unless the shoulder has been subjected to severe compression while in the shrugged position. The proximal end of the clavicle is forced down and back until it impinges on the first rib. It is then levered upward and usually forward, rarely backward. The intra-articular meniscus follows the sternal end of the clavicle. A small flake of bone, avulsed from the first rib or sternum may be observed on the roentgenogram.<sup>4</sup>

Clinical recognition of the condition is relatively simple. Severe complications or even death may occur, however, because of accompanying laceration of the great vessels, thoracic duct, trachea, esophagus, or the pleural dome. Open reduction was necessary in all cases found in the literature,<sup>10</sup> and fascial repair<sup>11</sup> or excision of the sternal end of the clavicle was required in most. Closed reduction within six hours and plaster volar fixation for five weeks produced an excellent result for the patient reported herein.

**Case 2** On 29 August 1956 a 17 year old man suffered an injury to his right foot on the basketball court. After jumping to score a basket his right foot struck the upright standard as he descended and he landed on the floor with the foot in an inverted position. Roentgenograms taken immediately demonstrated complete subtalar dislocation of the foot (figs. 4 and 5). Physical examination revealed an extreme inversion



Figures 4 and 5 (case 2) Note complete inversion dislocation at subtalar joint. Talus has remained in its normal position in the ankle mortise.

deformity of the foot. The skin on the lateral aspect was blanched by the pressure of the talus. Sensation and circulation were intact. Under general anesthesia two hours after the injury, the foot was reduced by traction with the knee flexed (fig. 6). Plaster immobilization was maintained for five weeks. The patient was returned to duty without restriction of motion in the foot or a



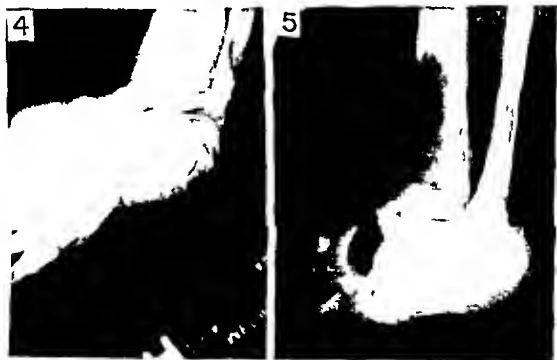
Figure 3 (case 1) Anteroposterior view of sternoclavicular joints at time of horizontal discharge demonstrating normal position of sternal end of clavicles. Small avulsed bony fragment is no longer discernible.

**Discussion** Stability of the sternoclavicular joint under ordinary circumstances is assured chiefly by the capsular apparatus containing the anterior and posterior sternoclavicular ligaments and the rhomboid (costoclavicular) ligament. The latter particularly limits upward excursion of the sternal end of the clavicle. The tendinous attachments of the sternomastoid in front, the sternohyoid and sternothyroid behind and the subclavius muscle belly below afford additional reinforcement. While suprasternal, presternal and retrosternal dislocations may occur, the latter is the least common and potentially the most dangerous.

The dislocation may result from force applied indirectly as in a fall on the point of the shoulder,<sup>2-6</sup> or directly as from a 'knee kick' or blow from a rifle butt.<sup>7</sup> Experiments on cadavers have demonstrated how the first rib protects against posterior dislocation unless the shoulder has been subjected to severe compression while in the shrug position. The proximal end of the clavicle is forced down and back until it impinges on the first rib. It is then levered upward and usually forward, rarely backward. The intra-articular meniscus follows the sternal end of the clavicle. A small flake of bone avulsed from the first rib or sternum may be observed on the reentgenogram.<sup>7</sup>

Clinical recognition of the condition is relatively simple. Severe complications or even death may occur, however, because of accompanying laceration of the great vessels, thoracic duct, trachea, esophagus, or the pleural dome. Open reduction was necessary in all cases found in the literature,<sup>12</sup> and fascial repair<sup>11</sup> or excision of the sternal end of the clavicle was required in most. Closed reduction within six hours and plaster volk fixation for five weeks produced an excellent result for the patient reported herein.

**Case 2** On 20 August 1956 a 17 year old man suffered an injury to his right foot on the basketball court. After jumping to score a basket his right foot struck the upright standard as he descended and he landed on the floor with the foot in an inverted position. Roentgenograms taken immediately demonstrated complete subtalar dislocation of the foot (figs. 4 and 5). Physical examination revealed an extreme inversion



Figures 4 and 5 (case 2) Note complete inversion dislocation at subtalar joint. Talus has remained in its normal position in the ankle mortise.

deformity of the foot. The skin on the lateral aspect was blanched by the pressure of the talus. Sensation and circulation were intact. Under general anesthesia, two hours after the injury, reduction was easily obtained by traction, plantar flexion, and eversion of the foot with the knee flexed (fig. 6). Plaster immobilization was maintained for four weeks. The patient was returned to duty on 29 October, without a limp or restriction of motion in the foot or ankle.



Figure 6 (case 2) Postreduction roentgenogram with foot encased in plaster

**Discussion** The interosseous talocalcaneal ligament is the chief agent responsible for the integrity of the subtalar joint. It is assisted in this task by the capsular ligaments of the talocalcaneal and the talocalcaneonavicular joints. The latter consists of a number of ligaments continuous at their edges. The lowest fibers of the deltoid ligament close the joint medially; the interosseous talocalcaneal ligament forms the postero-inferior part of the capsule; the lateral calcaneonavicular ligament closes the joint laterally; and the talonavicular ligament forms the upper part of the capsule.<sup>12</sup>

Subtalar dislocations may be inward, outward, backward, or forward. The former is the most common variety and may result from force applied to a foot in the inverted position. The talus is the only bone in the body without muscular attachment<sup>13</sup> and following the dislocation it drops into an equinus position, still well seated in the ankle mortise. Reduction is easily accomplished by reversing the direction of the dislocation with the knee flexed.<sup>14</sup> Prompt reduction and plaster immobilization for three to six weeks leads to an excellent result with little loss of stability or motion.<sup>15</sup> Since the major blood supply to the talus is undisturbed, avascular necrosis is not a problem.





# Actinomycosis of Mandible

HARVEY S JOHNSON *Captain DC USA*  
EDWIN J PULASKI *Lieutenant Colonel MC USA*  
CALVIN F THOMPSON *Captain, DC USA*

**A**CTINOMYCOSIS a granulomatous disease caused by the anaerobic organism *Actinomyces bovis* is not common among military personnel. When it does occur, the clinical form is usually cervicofacial involving the soft tissues. Necrosis of bone as an early manifestation is rare. Nevertheless, the possibility should be considered in the differential diagnosis of all subacute and chronic inflammatory processes of the cranial bones in which the causative agent is obscure. This report describes involvement of the mandible by *A. bovis* and the difficulties encountered in establishing the diagnosis.

## CASE REPORT

A 22 year-old Caucasian soldier was admitted to the Dental Service of this hospital on 31 August 1956 with cellulitis of the mandibular area of the left side of the face. He had been referred from a British military dispensary on a small island in the South Pacific.

The patient first experienced discomfort on 30 June 1956 2 months prior to admission at this hospital while aboard ship en route from London to the South Pacific. During the long cruise he had several episodes of swelling of the left side of the face with mandibular trismus and severe pain. Each time the condition regressed temporarily following penicillin therapy but during an acute exacerbation on 2 August 1956 spontaneous discharge of purulent exudate occurred within the oral cavity at the left buccal sulcus. Upon arrival of the patient at his duty station on 10 August incision and drainage were accomplished and he was observed closely until transferred to this hospital.

Prior to embarking from London the patient had been stationed at a nearby post in the country. He denied that he had chewed leaves, twigs or grass. Pending bacteriologic diagnosis he was given oral hygiene and started on a course of 0.5 gram of erythromycin three times a day.

The patient's temperature was 98.6 F, pulse rate 68/min and respiration 18/min. Physical examination was essentially negative.

except for a hard induration over the left mandibular area moderate trismus exhibited in mandibular movements and a discrete brawny red swelling in the submandibular area inferior to the region of the mental foramen. Introral examination revealed a full complement of caries free teeth. The third molars were impacted. The left second bicuspid had no pulp vitality. The soft tissues of the oral cavity were normal in color and tone, with the exception of the left mandibular buccal sulcus where there was evidence of a recent incision. Pus expressed from this incision was cultured and yielded alpha hemolytic streptococci.

The results of routine blood studies, urinalysis, serologic examinations, and roentgenogram of the chest were normal. A left lateral roentgenogram of the mandible revealed two markedly radiolucent areas both approximately 1.5 by 1.5 cm in size (fig. 1) of which one was near the mental foramen and the other posterior and inferior to the second molar tooth. Irregular margins appeared along the course of the mandibular canal between the two radiolucent areas. A postero-anterior projection revealed a lifting of the periosteum at the inferior border of the mandible.



Figure 1 Roentgenogram showing extensive destruction of left mandible

The day after admission incision and drainage were performed under endotracheal general anesthesia through the erythematous swollen submandibular area. While the heavy beard was being shaved in preparation for the operation the skin was nicked and pus was released. Exploration through the enlarged opening disclosed ruptured, friable grossly necrotic submandibular tissue. Surprisin encountered. Swab cultures from this streptococci and *Micrococcus pyogene*.

# Actinomycosis of Mandible

HARVEY S. JOHNSON *Captain, DC, USA*  
EDWIN J. PULASKI *Lieutenant Colonel MC USA*  
CALVIN W. THOMPSON *Captain DC USA*

**A**CTINOMYCOSIS a granulomatous disease caused by the anaerobic organism *Actinomyces bovis* is not common among military personnel. When it does occur, the clinical form is usually cervicofacial involving the soft tissues. Necrosis of bone as an early manifestation is rare. Nevertheless, the possibility should be considered in the differential diagnosis of all subacute and chronic inflammatory processes of the cranial bones in which the causative agent is obscure. This report describes involvement of the mandible by *A. bovis*, and the difficulties encountered in establishing the diagnosis.

## CASE REPORT

A 22 year old Caucasian soldier was admitted to the Dental Service of this hospital on 31 August 1956 with cellulitis of the mandibular area of the left side of the face. He had been referred from a British military dispensary on a small island in the South Pacific.

The patient first experienced discomfort on 30 June 1956, 2 months prior to admission at this hospital while aboard ship en route from London to the South Pacific. During the long cruise he had several episodes of swelling of the left side of the face with mandibular trismus and severe pain. Each time the condition regressed temporarily following penicillin therapy but during an acute exacerbation on 2 August 1956 spontaneous discharge of purulent exudate occurred within the oral cavity at the left buccal sulcus. Upon arrival of the patient at his duty station on 10 August incision and drainage were accomplished and he was observed closely until transferred to this hospital.

Prior to embarking from London the patient had been stationed at a nearby post in the country. He denied that he had chewed leaves, twigs or grass. Pending bacteriologic diagnosis he was given oral hygiene and started on a course of 0.5 gram of erythromycin three times a day.

The patient's temperature was 98.6 F, pulse rate 68/min and respiration 18/min. Physical examination was essentially negative.



Figure 5 Appearance of mandible three and one half months after healing of soft tissues

### DISCUSSION

Differentiation of actinomycosis from granulomas due to *nocardia*, *coccidioides*, tuberculosis, neoplasms, and syphilis is imperative. Even though fungal infection may be suspected, considerable difficulty may be encountered in validating the suspicion.<sup>1</sup>

Perlstein<sup>2</sup> stated that physical and immunological properties of the original granulomatous tissues and the character of the inoculum determine the distribution, paucity, or absence of the actinomycosis in exudates. As demonstrated in our case, repeated cultures were negative for specific pathogens. Holm<sup>3,4</sup> has advanced the hypothesis that actinomycotic infections are mixed infections which arise through synergism of the anaerobic ray fungi and various pyogenic bacteria. Thus, argument prevails as to whether actinomyces is the true invasive pathogen or a chance contaminant superimposed on a nonspecific infection. The latter thesis is suggested in our case, provided one assumes the precipitating factor to have been pyogenic dental infection with superinfection by *A. bovis*.

Coley<sup>5</sup> and Coley and Higinbotham<sup>6</sup> separated bony actinomycosis into three categories—primary infection, secondary involvement of bone by encroachment from adjacent, soft tissues, and secondary involvement of bone by hematogenous metastatic foci. Our case was not metastatic. Could the infection have been primary or was the osseous infection secondary to soft tissue infection? This question remains unanswered inasmuch as the patient

# Metallic Foreign Body in Mandible for 59 Years

LOUIS J LOSCALZO D D S  
MORTON S BROD D D S

**T**HE presence of a metallic foreign body in human tissues often requires no more than local care of the wound. The foreign body may be permitted to remain in place and merely be noted on a medical chart for future reference, since late reactions to foreign bodies after years of dormancy are no longer considered unusual.

On the other hand, situations will arise when removal of a foreign body metallic or otherwise, becomes prudent or even immediately necessary. It may impinge on essential anatomic structures incite infectious reactions or be a source of continuous pain. Nevertheless, the apparent tendency is to weigh the alternatives carefully before attempting its removal. Antibiotics have notably reduced the incidence of infection, but accurate localization continues to remain a frequent problem. The ease that follows poses no such difficulties.

## CASE REPORT

A 77 year old Negro, a veteran of the Spanish-American War was referred to this hospital for evaluation of a symptomatic foreign body located in the right mandible. The patient gave a clear history of having received gunshot wounds to the face during his military service in 1899 and of being aware for many years that a "bullet" lay lodged in his jaw. Its entrance he described as somewhere at the right angle region though only a suggestion of scarring could be found. His chief complaint of pain on eating and tenderness of the cheek over the mass started several months earlier when the remainder of his teeth on the affected side were removed.

Examination revealed a poorly nourished man in no acute distress. There was a hard mass over the right body of the mandible continuous with it and extending outward raising the thin overlying facial tissues from other normal contour which were very tender to palpation. Intraorally the same mass was located in the mucobuccal fold of the buccal cuspid molar area the overlying mucosa being tender and inflamed.

Radiographs revealed the presence of a large metallic fragment, 1 by 2 cm, embedded in the mandible as described, with multiple, smaller, irregularly shaped, metallic foreign material situated locally (fig. 1). Several small spherical densities also were seen overlying the facial bones and scattered throughout the chest wall.



Figure 1 Roentgenogram showing bullet in right mandible and numerous spherical densities scattered over facial bones.

A thorough medical study was requested. All laboratory tests were within normal limits, and no contraindications to surgery were encountered.

At operation, anesthesia was obtained by local anesthesia and infiltration. A mucoperiosteal flap was reflected. Little resistance, except in the region of the masseter muscle, was encountered in capsular fashion, incorporating elements of the masseter muscle bundle. By sharp and blunt dissection, the bullet was exposed, circumscribed and found to be coming a well-formed bullet, approximately 0.38 caliber. Half of the bullet was removed in an anteroposterior direction and the remaining portion was removed in varying degrees by bone-like tissue (fig. 2). The bullet was removed at the point of the missile was lead-tipped and was of the type which movement could be obtained by elevating a portion of the adjacent bone and the bullet was removed. The bullet was found to be cortical in nature. Several small lead particles were found, some of which were firmly fixed. These, though superficial, were left in place. The wound was debrided of soft tissue and closed with interrupted No. 000 black silk sutures.

# Metallic Foreign Body in Mandible for 59 Years

LOUIS J. LOSCALZO D D S  
MORTON S. BROD D D S

**T**HE presence of a metallic foreign body in human tissues often requires no more than local care of the wound. The foreign body may be permitted to remain in place and merely be noted on a medical chart for future reference, since late reactions to foreign bodies after years of dormancy are no longer considered unusual.

On the other hand, situations will arise when removal of a foreign body, metallic or otherwise, becomes prudent or even immediately necessary. It may impinge on essential anatomic structures, incite infectious reactions, or be a source of continuous pain. Nevertheless, the apparent tendency is to weigh the alternatives carefully before attempting its removal. Antibiotics have notably reduced the incidence of infection but accurate localization continues to remain a frequent problem. The case that follows posed no such difficulties.

## CASE REPORT

A 77-year-old Negro, a veteran of the Spanish-American War, was referred to this hospital for evaluation of a symptomatic foreign body located in the right mandible. The patient gave a clear history of having received gunshot wounds to the face during his military service in 1899 and of being aware for many years that a "bullet" lay lodged in his jaw. Its entrance he described as somewhere at the right angle region, though only a suggestion of scarring could be found. His chief complaint of pain on eating and tenderness of the cheek over the mass started several months earlier when the remainder of his teeth on the affected side were removed.

Examination revealed a poorly nourished man in no acute distress. There was a hard mass over the right body of the mandible, continuous with it and extending outward, raising the thin overlying facial tissues from other normal contour, which were very tender to palpation. Intraorally, the same mass was located in the mucobuccal fold of the bicuspid-molar area, the overlying mucosa being tender and inflamed.

to assume that the foreign body was asymptomatic in bone, but that once the thin cheek tissues were no longer supported by teeth, their distention at one point became painful, especially with motion of the jaws.

Seldom does one have the experience of removing a bullet that had been in vivo for 59 years.

#### REFERENCES

- 1 Botsford T W and Freni D R Late reactions to metallic foreign bodies *New England J Med* 238 385-390 Mar 18 1948
  - 2 Martin W Significance of foreign bodies in tissues *Ann. Surg* 63 24-34 Jan 1916.
- 

#### A CASE OF FACIES RUBER MEDICI

"A 26-year-old patient who had been seen on previous occasions because of corneal scars following trachoma in his childhood, associated with high myopia complained of a burning sensation in his eye.

"He was examined with the slitlamp and the left eye showed numerous dustlike iridescent particles in the anterior chamber and also on the iris surface. The pupil was deep black and did not react to light. The possibility of cholesterol crystals in the anterior chamber was considered.

"During the examination the patient was restless and almost hostile making a more careful observation impossible. Further studies were abandoned when he pointed out that this was his glass eye."

—JOHN J STERN M D  
in *American Journal of Ophthalmology*  
p 308 Feb 1957



with complete cessation of symptoms and on the seventh postoperative day the patient was discharged



*Figure 2 Photograph of bullet showing partial covering of bone*



*Figure 3 Postoperative roentgenogram revealing various lead particles left in situ.*

**Comment** Bullets and other foreign bodies entering bone often do not incite a violent reaction. Usually a capsule of connective tissue is found surrounding the foreign body, and then a layer of sclerotic bone. In some cases, however, the object is in direct contact with bone. It was impressive to note in this case how perfectly the tissues had adapted themselves to the foreign body. There was no evidence whatsoever of any lytic process around the bullet. It is reasonable therefore

to assume that the foreign body was asymptomatic in bone, but that once the thin cheek tissues were no longer supported by tooth, their distention at one point became painful, especially with motion of the jaws

Seldom does one have the experience of removing a bullet that had been in vivo for 59 years

#### REFERENCES

- 1 Botsford T W and Freni D R Late reactions to metallic foreign bodies *New England J Med* 238 385-390 Mar 18 1948
  - 2 Martin W Significance of foreign bodies in tissues *Ann Surg* 63 24-34 Jan 1916
- 

#### A CASE OF FACIES RUBER MEDICI

"A 26-year-old patient who had been seen on previous occasions because of corneal scars following trachoma in his childhood associated with high myopia complained of a burning sensation in his eye

"He was examined with the slitlamp and the left eye showed numerous dustlike iridescent particles in the anterior chamber and also on the iris surface The pupil was deep black and did not react to light The possibility of cholesterol crystals in the anterior chamber was considered

"During the examination the patient was restless and almost hostile making a more careful observation impossible Further studies were abandoned when he pointed out that this was his glass eye "

—JOHN J STERN M D  
in *American Journal of Ophthalmology*  
P 308 Feb 1957

## Departments

### A MESSAGE FROM THE A M A

One of the many important topics acted on at the 106th Annual Meeting of the American Medical Association in New York City in June 1957 should be of particular interest to all physicians, because it pertains to the ethical conduct of the medical profession. After five years of discussion and deliberation by the governing body of organized medicine, the House of Delegates of the American Medical Association approved a revision of the Principles of Medical Ethics.

In June 1952 recognizing the need for a revision of the Principles of Medical Ethics, the House of Delegates assigned the task to the A M A's Council on Constitution and Bylaws. In December 1953 and during subsequent sessions of the House of Delegates piecemeal revisions were considered. Some of these were adopted while others were referred for additional study. Following these actions, an entirely new proposal for revision of the Principles was submitted to the House in June 1956. It was voted that the new version should lie over until the next meeting of the House before final action would be taken. In December 1956 the House adopted the preamble and 6 of the 10 sections of the new principles as submitted. It recommended that a restudy of sections 6 and 7 should more clearly define the ethical problems of corporate practice of medicine, fee splitting and the dispensing of drugs and appliances. Following this restudy of sections 6 and 7, recommended changes were suggested and accordingly acted on during the June 1957 session of the Association.

The final version presented by the Council on Constitution and Bylaws and then amended by reference committee and House discussion in New York City, is submitted as a matter of interest to military medical officers. The newly adopted principles now read as follows:

#### PREAMBLE

These principles are intended to aid physicians individually and collectively in maintaining a high level of ethical conduct. They are not laws but standards by which a physician may determine the pro-

---

From the Council on National Defense of the American Medical Association. The views and opinions expressed are not necessarily those of the Department of Defense.  
—Editor

priety of his conduct in his relationship with patients with colleagues, with members of allied professions, and with the public

*Section 1* —The principal objective of the medical profession is to render service to humanity with full respect for the dignity of men. Physicians should merit the confidence of patients entrusted to their care, rendering to each a full measure of service and devotion

*Section 2* —Physicians should strive continually to improve medical knowledge and skill, and should make available to their patients and colleagues the benefits of their professional attainments

*Section 3* —A physician should practice a method of healing founded on a scientific basis and he should not voluntarily associate professionally with anyone who violates this principle

*Section 4* —The medical profession should safeguard the public and itself against physicians deficient in moral character or professional competence. Physicians should observe all laws, uphold the dignity and honor of the profession and accept its self imposed disciplines. They should expose, without hesitation, illegal or unethical conduct of fellow members of the profession

*Section 5* —A physician may choose whom he will serve. In an emergency, however, he should render service to the best of his ability. Having undertaken the care of a patient he may not neglect him and unless he has been discharged he may discontinue his services only after giving adequate notice. He should not solicit patients

*Section 6* —A physician should not dispose of his services under terms or conditions which tend to interfere with or impair the free and complete exercise of his medical judgment and skill or tend to cause a deterioration of the quality of medical care

*Section 7* —In the practice of medicine a physician should limit the source of his professional income to medical services actually rendered by him or under his supervision to his patients. His fee should be commensurate with the services rendered and the patient's ability to pay. He should neither pay nor receive a commission for referral of patients. Drugs, remedies or appliances may be dispensed or supplied by the physician provided it is in the best interests of the patient

*Section 8* —A physician should seek consultation upon request in doubtful or difficult cases or whenever it appears that the quality of medical service may be enhanced thereby

*Section 9* —A physician may not reveal the confidences entrusted to him in the course of medical attendance, or the deficiencies he may observe in the character of patients unless he is required to do so by law or unless it becomes necessary in order to protect the welfare of the individual or of the community

*Section 10* —The honored ideals of the medical profession imply that the responsibilities of the physician extend not only to the individual but also to society where these responsibilities deserve his interest and participation in activities which have the purpose of improving both the health and the well being of the individual and the community

---

#### CERTIFICATE OF MERIT AWARDED TO NAVY EXHIBIT AT A. M. A MEETING

The scientific exhibit from U S Naval Hospital St Albans N Y on "Newer Approaches to Study of the Liver" was awarded the Certificate of Merit in the Armed Forces section at the American Medical Association meeting held in New York in June 1957. The exhibit which illustrated the joint research work of six or more medical officers portrayed the use of physiologic, histologic, biochemical and isotopic techniques in assessing the liver. Hepatic catheterization was demonstrated by a transparency figure of the thorax with illuminated and animated sequential advance of the catheter through the venous pathways from the arm through the heart to the liver.

## NEW PRESIDENT OF AERO MEDICAL ASSOCIATION

Captain Ashton Graybiel, Medical Corps U S Navy, distinguished teacher and cardiologist, was installed 10 May as the 29th president of the Aero Medical Association at a banquet closing its annual scientific meeting at the Shirley Savoy Hotel in Denver, Colo. He succeeds Dr. Jan H. Tillisch, who is consultant in medicine at the Mayo Clinic and medical director of the Northwest Airlines.



Captain Graybiel has had an illustrious career in aviation medicine. A graduate of Harvard Medical School in 1930, he pursued training in cardiology in Boston, ultimately publishing two volumes on electrocardiography, and is a Past President of the American College of Cardiology. He holds certification by the American Board of Preventive Medicine (Aviation Medicine).

For his contributions to aviation medicine, Captain Graybiel received the Theodore C. Lyster Award in 1950 and the Legion of Merit in 1952. He is at present Director of Research at the U S Naval School of Aviation Medicine, U S Naval Air Station, Pensacola, Fla.

## DISTINGUISHED SERVICE MEDAL AWARDED TO COMMANDING GENERAL OF WALTER REED

The U S Army's highest noncombat award the Distinguished Service Medal was presented on 10 June 1957 to Major General Leonard D Heaton Commanding General of Walter Reed Army Medical Center by



Secretary of the Army Wilber M. Brucker. Those present at the ceremony included Mrs. Heaton, Assistant Secretary of Defense Frank B. Berry and Army Chief of Staff General Maxwell D. Taylor. The citation was as follows:

Major General Heaton distinguished himself by exceptionally meritorious service in a position of great responsibility during the period 9 June 1956 to 15 November 1956. In a number of important surgical operations General Heaton displayed excellent diagnostic acumen, exceptional surgical judgment, outstanding surgical skill and devotion to his patients which resulted in consistently admirable results. His achievements have merited the high regard of his professional associates, exemplified the finest traditions of the service and reflected the highest credit upon himself and the United States Army.

## MEETING OF SECTION ON MILITARY MEDICINE, SCIENTIFIC ASSEMBLY OF A M A

The meeting of the Section on Military Medicine Scientific Assembly of the American Medical Association, which was held in New York in June 1957 during the annual meeting of the Association, was a complete success, with attendance considerably better than it was last year. The professional papers were of high caliber and were followed by authentic discussions that added greatly to the topics presented. The report by Dr Frank B Berry Assistant Secretary of Defense (Health and Medical) relative to the activities of his office during the past year deserves special mention because of its quality and high informative content. The same applies to the paper on "Dependent Medical Care" given by Major General Paul I Robinson MC, USA and discussed by Rear Admiral Nelson Assistant Surgeon General, and Chief of Hospitals U S Public Health Service, and by Captain Guy E. Stahl, MC, USN Director, Dependent's Medical Care Division Bureau of Medicine and Surgery, Department of the Navy.

The following officers were appointed at the business meeting to serve for the 1957-1958 term



Silas B. Hays Major General MC  
USA Surgeon General Department of  
the Army (Chairman)



Alphonse McMahon Rear Admiral MC  
USNR (Ret) Associate Professor of  
Medicine St. Louis University  
School of Medicine St. Louis, Mo  
(Vice Chairman)





Charles H. Branstetter, Colonel USAF (MC) Deputy Director Professional Services Office of the Surgeon General, Department of the Army (Secretary)



Charles L. Leedham, Colonel MC, USA (Ret) Director of Education, Cleveland Clinic Foundation, Cleveland, Ohio (Delegate)



Douglas B. Kendrick, Colonel MC, USA, Office of Surgeon General, Department of the Army (Representative to Scientific Exhibit)

Charles P. Campbell, M.D. of Hackensack, N.J. was re-elected to serve as Alternate Delegate to the Section on Military Medicine.

The officers who served for the 1956-1957 term were Chairman Colonel Russel V. Lee, USAFR (MC) (Inactive), Palo Alto Medical Clinic, Calif.; Vice Chairman Major General Silas B. Hays, MC, USA, Surgeon General, Department of the Army; Secretary Captain Cecil L.

August 1957)

SCIENTIFIC ASSEMBLY OF A M A

123

Andrews MC, USN Director Professional Division Bureau of Medicine and Surgery, Department of the Navy, Delegate, Colonel Charles L Leedham, MC USA (Ret), Director of Education, Cleveland Clinic Foundation Cleveland Ohio, and Representative to Scientific Exhibit, Colonel Frank M Townsend, USAF (MC), Armed Forces Institute of Pathology Walter Reed Army Medical Center, Washington D C

---

DEATHS

LYNCH, Mary Josephine Second Lieutenant, USAFR (NC), of Sioux Falls S D stationed at U S Air Force Hospital, Altus Air Force Base, Oklahoma graduated in 1956 from the Minneapolis General Hospital School of Nursing, Minneapolis, Minn appointed a Second Lieutenant in the United States Air Force Reserve 25 January 1957 ordered to active duty 21 March 1957 died 9 June 1957, age 22, near Altus Air Force Base by drowning

RUIE Carolyn Helen Captain USAF (NC) of Springfield Mass stationed at 3501st Recruiting Group Mitchel Air Force Base, N Y graduated in 1948 from the Lenox Hill Hospital School of Nursing New York, N Y commissioned a Second Lieutenant in the U S Army 3 November 1948 died 11 June 1957, age 36, at U S Air Force Hospital, Westover Air Force Base Mass of uremia resulting from glomerulonephritis

SMITH, Edward Milton Jr, Commander MC USN, of Baltimore Md stationed at Headquarters, Fifth Naval District, Norfolk, Va graduated in 1946 from the University of Maryland School of Medicine and College of Physicians and Surgeons Baltimore, Md entered the Naval Service 6 November 1942 appointed a Lieutenant (junior grade) in the United States Naval Reserve 6 March 1946 ordered to active duty 10 July 1947 commissioned a Lieutenant (junior grade) in the United States Navy 30 December 1947 died 13 May 1957 age 34, at Norfolk Va as a result of an automobile accident

## AMERICAN STOMATOLOGICAL SOCIETY OF JAPAN SPONSORS CONFERENCE

Since its organization as a professional study group in 1954 the American Stomatological Society of Japan has developed into a major dental society wherein personnel of the Army Navy and Air Force have co operated to the fullest extent This year the Society achieved great success in sponsoring the Fifth Central Japan Dental Conference which was held at the U S Army Hospital Tokyo Over 150 Japanese dentists and American dental officers attended together with Dr William R Alstadt President Elect of the American Dental Association and three other visiting A D A members



*Dr William R. Alstadt (center) President Elect of the American Dental Association, talks with Colonel William B. Simms DC USA Chief Oral Surgery Section, U S Army Hospital Tokyo and Captain Victor A. LeClair DC USN Force Dental Officer Naval Forces Far East during the Fifth Central Japan Dental Conference held at the Hospital. Colonel Simms is the President of the American Stomatological Society of Japan which sponsored the conference*

## OFFICERS CERTIFIED BY SPECIALTY BOARDS

### Supplementary Listing

According to information from the Office of the Surgeon General of the United States Navy, the following regular Medical Corps officers have been certified by the boards indicated since the listings published in previous issues of this *Journal*

#### American Board of Orthopaedic Surgery

Robert C Doolittle Comdr USN

#### American Board of Internal Medicine

Francis J Linehan Lt Comdr USN

Paul T Moore Capt USN

Robert J McCarthy Comdr USN

Robert J Whipple Capt USN

#### American Board of Ophthalmology

Joseph M Sanderlin Lt USN

#### American Board of Surgery

John I F Knud Hansen Comdr USN

#### American Board of Plastic Surgery

William J Champion Lt Comdr USN

## BOOKS

### Reviews of Recent Books

GIFFORD'S TEXTBOOK OF OPHTHALMOLOGY by Francis Heed Adler  
M D 6th edition 499 pages 227 figures with 26 color plates W B  
Saunders Co Philadelphia Pa 1957 Price \$8

In his preface Dr Adler has emphasized that this book was written for the medical student and general practitioner. This statement has been made by many previous authors but seldom if ever has one succeeded so admirably in producing a text adapted for this purpose. Material of primary interest to the ophthalmologist alone has been deleted.

There are excellent sections on how to examine the eye with the equipment available to the student and practitioner. Other chapters describe what should be looked for and the significance of various conditions. The chapter on disturbances of ocular motility is an extremely valuable one for the practitioner. It points out the causes of various disturbances and their diagnostic significance. It should enable the physician to intelligently refer his patients for care to answer their questions and to actively participate in the treatment

the patients he refers to ophthalmologists. The chapter on refractive errors describing the patient's problems and when he should or should not wear his glasses is lucid. It should help to make the generalist a part of the eye care team and not just a referral agency in it.

The more common eye diseases are detailed and their treatment is indicated. Rarer conditions are omitted. The information given will in most instances enable the physician to determine whether the patient may be safely treated or whether he should be referred to an ophthalmologist for care. The same reasoning has been applied to the material on surgical procedures. Those which a general practitioner may carry out (if properly equipped) are detailed. Other surgical procedures e.g. cataract extraction are explained in principle only but the indications and contraindications for surgery are discussed in detail. The practitioner who has read this section will be in good position to explain why the postoperative cataract patient has certain adjustment difficulties or why certain monocular cataracts should or should not be removed surgically.

The section on ocular manifestations of general diseases emphasizes those diagnostic eye signs which the general practitioner can utilize to diagnose systemic disease. The section on arteriosclerosis and hypertension with the discussion of the fundus findings is alone well worth the price of the book.

There are many new illustrations. They are clear, well reproduced, easily understood, and generous in number.

This book could have been written only by an individual with many years of experience in the teaching of students in ophthalmology. Only such a person could foresee the material which would confuse students and therefore place it in the most understandable form. Only a teacher could have managed to so clearly follow his objective of not writing a condensed ophthalmology book but one devoted to the ophthalmology requirements of a large segment of physicians. This book has been a pleasure to review and it is highly recommended for inclusion in the libraries of medical students and general practitioners of medicine —VICTOR A. BYRNES Brig Gen. USAF (MC)

**THE FIGHT FOR FLUORIDATION** by Donald R. McKay 241 pages Oxford University Press New York N Y, 1957 Price \$5

This excellent little book is written in an interesting style by a qualified historian.

It contains 10 very well documented chapters covering the years 1901-1956 beginning with the original work of McKay and carrying through some of the most recent referenda.

The writer employs many quotations and anecdotes in giving a blow by blow description of the fight for adoption of one of the most controversial public health measures of our time. The cautious attitude of the researchers, the exuberant enthusiasm of the profluoridation clinicians, and the "rabble rousing" tactics of their opponents are vividly recounted.

The story unfolds as would a historical novel. Each chapter reveals a new facet of a real life struggle that could occur only in America. The issue of human welfare versus human rights arises at every turn.

The volume closes with two valuable sections, one a 28-page outline of notes containing all references by chapter and the other containing an essay on the sources of this material.

This work will find many readers, especially those interested in dental history, and those in the field of Public Health Dentistry.

—DONALD C. HUDSON Col USAF (DC)

**CLINICAL OPERATIVE DENTISTRY**, edited by William John Simon. 381 pages 650 illustrations on 538 figures. W. B. Saunders Co., Philadelphia, Pa., 1956 Price \$9.50

Clinical operative dentistry has never been recognized as a separate field of study in dentistry. As pointed out by Dr. Simon, the majority of textbooks on operative dentistry in the past have included other fields. However, in the progress of recent years these have been segmented out as specialized areas of study.

Dental caries has often been recognized as the most endemic of human disease. Therefore, its prevention and control is of vital im-

portance to the health of all mankind. This excellent publication deals in its entirety with the science of the treatment of dental caries, embracing most of the known tried and accepted techniques as well as new developments in the art of operative dentistry.

An excellent and complete evaluation is made of the various types of cavity preparation required for each of the accepted filling materials used in dental restorations. In addition the clinical indications for each type of material are clearly and logically defined. Dr. Simon comprehensively but without too much detail discloses the basic physical properties of each filling material. This provides the student or the practitioner with the knowledge to select a proper filling material for the tooth at hand.

Not only are the basic fundamentals of cavity preparation clearly described for each material but identification to meet variations in stress and retention are also well portrayed. Step-by-step procedures from the initial cuts in the preparation to the final polishing of the filling are clearly and completely described. Many ingenious techniques described in the placement of silicate and acrylic materials cannot only be applied as timesavers for the practitioner but will prove to be valuable knowledge to the student.

The contents of the chapter Inlay Restorations with its excellent illustrations and clear description of the various techniques of inlay construction should provide a source of valuable comprehensive knowledge to all practitioners who are interested in maintaining and reviewing their inlay capabilities.

The chapter on the use of gold foil is also complete and comprehensive. For the practitioner who only on occasion avails himself of the use of this king of all filling materials this chapter would afford an invaluable review of cavity preparation and handling of gold foil. The use of the rubber dam with its unparalleled ability to provide a sterile and dry field of operation and many other advantages is well covered.

Although this book appears to be primarily designed as a textbook of clinical operative dentistry for students it should be well received by those members of the profession whose practice for the greater part embraces the dental operative fields. It will provide material for review and improvement of professional competence since it not only includes tested and tried techniques but also covers fully the latest advancements that have proved practical and sound.

—CHARLES S. O'GRADY, Col. USAF (DC)

August 1957)

REVIEWS OF RECENT BOOKS

1239

THE EARLY DETECTION AND PREVENTION OF DISEASE edited by John P. Hubbard M D 350 pages The Blakiston Division, McGraw Hill Book Co Inc, New York N Y 1957 Price \$7.50

One of the major problems yet to be solved in public health lies in the field of early detection and prevention of disease. This book is a timely and important contribution to the solution of a major public health problem. The prevention of many noncommunicable and chronic diseases and/or their disabling effects lies within the province of the practitioner of medicine. The subjects covered include preventive medicine in relation to the cardiovascular system, the gastrointestinal system, the musculoskeletal system, pelvic cancer, mental health and a review of immunization and the practical application of preventive medicine in the armed services. It is regrettable that more was not said about mental disorders and alcoholism, as well as neoplasia.

This volume is an edited symposium, by many authors at a five day meeting arranged and directed by the Department of Public Health and Preventive Medicine, University of Pennsylvania. The intent was to develop a better understanding of preventive medicine in the clinical practice of medicine. It represents independent and separate thinking by outstanding men in each field on the early detection and prevention of disease.

This publication is recommended for all persons interested in the practice of medicine and should be of great value to the practicing physician and public health leaders.

The material in regard to each subject is short and would perhaps leave much to be desired from individuals seeking specific knowledge. The bibliography following the subjects is adequate. It is hoped that this type of work will create an interest in additional publications. Unfortunately, the lack of much factual data and the brevity of many of the subjects with an excessive price, will perhaps considerably reduce the sale of this important publication.

—THOMAS G. FAISON Col MC, USA

SPINAL CORD COMPRESSION Mechanism of Paralysis and Treatment by I. M. Tarlov M D 147 pages illustrated Charles C Thomas Publisher Springfield Ill, 1957 Price \$7.50

In this book for the first time a program is presented for the treatment of patients suffering from spinal compression syndromes. This program is based on controlled animal experiments and supported by careful studies in man. The author is Professor of Neurology and Neurosurgery at New York Medical College and is well known for his attempts to blend together experimental studies and clinical facts.

The book is divided into three sections. The first is on experimental studies—an introduction. A simple, unique method of studying spinal compression under carefully regulated conditions is presented in detail. Physiologic and histologic results are discussed. The second section



is on clinical studies. Here a review of literature is given with a discussion of spinal cord and cauda equina compression by trauma and tumors. The results of decompressions and a guide to prognosis for the patient is given. The third section is on early management of acute compressive spinal paralysis. The mechanisms of injury, the first aid and the indications for and the timing of operation is shown.

The author has presented in this compact but comprehensive monograph a logical approach to the problem, that tremendously important problem found in the patient with impending or already complete spinal cord paralysis. The illustrations are good. The language and terminology is clear and simple. The book is intended as a guide and inspiration for further work and is a sensible approach in the management of those so afflicted. —FRANK B. CLARE, *Corvallis, OR, USA*

**BASIC FACTS OF PHARMACOLOGY** by Stewart W. Brooks. Pp. G. B. S. M. S. 323 pages illustrated. W. B. Saunders Co. Philadelphia Pa. 1957. Price \$4.

This new text written especially for the student nurse has definite value for all nursing service personnel who have responsibility for the administration of drugs and direct patient-care.

The author has used an unique approach in stressing the actions of drugs. The core of the textual material is concerned with the actions of drugs (facts which do not change). Basic drugs are simply and completely discussed in relation to their respective actions on the central nervous system, the autonomic nervous system, the heart, blood vessels, and blood and body surfaces. Drugs used to treat infections are described as "anti-infectives" and are classified as local and systemic anti-infectives.

Meaningful illustrations serve to provide a knowledge of the relationship between the chemical composition and the pharmacologic actions of the drugs covered in the text. Structural chemical formulas used in the form of illustrations are self-explanatory and contribute to the basic intent of the author.

A separate chapter is devoted to a discussion of hormone therapy. Further drugs which do not logically fall in the separately discussed classes are treated as "miscellaneous agents."

The subject of toxicology is discussed specifically in relation to general principles of treatment and a comprehensive classification of poisons is presented.

Pertinent questions are included at the end of each chapter. The appendix contains a complete glossary of all terms used in the text, a list of important drugs in current use, and suggested experiments for use in demonstrating specific types of pharmacologic action.

August 1957)

REVIEWS OF RECENT BOOKS

1211

The unique format and style of this text should have special appeal to its users. Professional and nonprofessional nursing service personnel as well as instructors in nursing should derive great benefit from this essential ready reference. —DOROTHY V. ELLIOTT May ANG

ANNALS OF THE NEW YORK ACADEMY OF SCIENCES Volume 66, Part 3  
Pages 417-840 March 14, 1957 Editor-in-Chief Otto V. St. Whitelock  
Associate Editor Franklin A. Furness "The Pharmacology of Psychotomimetic and Psychotherapeutic Drugs" Conference Chairman and Consulting Editor Seymour S. Kety 423 pages illustrated The New York Academy of Sciences New York N.Y. 1957 Price \$5

This volume is a compilation of papers presented at a conference on psychotomimetic (phrenotropic) and psychotherapeutic (ataractic) drugs sponsored by the New York Academy of Sciences in April 1956. The goal of the conference was to present a summary of the current hypotheses concerning the neurophysiologic action, biochemical activity, and pharmacologic and clinical effects of phrenotropic and ataractic drugs in present-day experimental and clinical use.

There is an additional series of papers presenting several hypotheses as to the role of the substance serotonin in the central nervous system.

This compilation is highly technical in nature, but will be of great value to the scientist interested in basic clinical research into the activities of these drugs and their relationship to the mechanisms of cerebration. The practicing clinical psychiatrist should find much value in the material presented regarding the biochemical and pharmacologic basis for the clinical action of these drugs in mental illness, as well as for their side effects.

As a matter of general medical interest there appears a rather sobering series of hypotheses which should be carefully considered in view of the present day wide and sometime indiscriminate use of ataractic drugs, that their action might represent a basic effect on the molecular structure of cerebral cells that they may be drastically altering the cellular and enzymatic systems concerned in the transmission of cerebral synaptic impulses or may be exerting a mass effect on the mechanical actions of glial cells in brain nutrition.

A great deal of organizational effort is apparent in the presentation of differing hypotheses with regard to the specific action of each of these drug groups and the discussion sections of the papers present material in support and refutation of their hypothesis as well as material additionally presented in an effort to gather together information from all the hypotheses in order to provide valid paths for future research. There are interesting historical sidelights on the development of understanding of the chemical dynamics of the central nervous system and a few papers detailing the general or chemical activity of phrenotropic and ataractic drugs used since antiquity such as mescaline, rauwolfia, and ibogaine.

Included in each section are some philosophical ponderings regarding the general effects of these drugs on civilization with one especially interesting premise that perhaps basic research on these drugs might now provide a bridge between *Homo faber* and *Homo sapiens* the advent of an era of transition in medical research from the mechanics of human behavior to the philosophy of human behavior.

—DEAN J. PLAZA, U. MC, USA

**HUMAN CANCER** A Manual for Students and Physicians by Maurice A. Black, M. D. and Francis D. Sree, M. D. F. C. A. P. 273 pages illustrated. The Year Book Publishers Inc. Chicago Ill. 1957. Price \$7.50.

This is an effort to present the experimental biologic biochemical clinical and therapeutic aspects of human cancer in a 273 page volume. The aim of the authors is "a concise and systematic presentation to guide the neophyte to what is known indicate the unknown and controversial orient him toward critical observations and the contributions of new knowledge" in human cancer. The authors accomplish this aim well with the medical student always in mind.

That both of the authors are pathologists could be suspected from the excellence of the chapters on human carcinogenesis and biological behavior of cancer. Similarly their laboratory orientation is demonstrated in the clinical chapters where the selection of sources and the bibliography are not always the most authoritative. Also characteristic of many pathologists is their lack of enthusiasm for cytological diagnostic methods and procedures radical surgery and excessive palliative measures in cancer.

This book should be an excellent text for cancer co-ordination courses in oncology in medical schools.

—RONALD A. GRANT Capt MC USA

**COLD INJURY** Transactions of the Fourth Conference November 7, 8 and 9 1955 Princeton N. J. edited by A. Irene Ferrer M. D. 371 pages illustrated. Josiah Macy Jr. Foundation Publications New York N. Y. 1956. Price \$5.95.

This volume follows the same format of informal discussion by experts as previous Transactions of Conferences on Cold Injury sponsored by the Josiah Macy Jr. Foundation. Though the Medical Director of these Conference Groups Dr. Frank Fremont Smith, frankly states in the foreword that such a format has aroused some criticism along with considerable interest much can be said in favor of it particularly the lively candid and constructive criticism and exchange of ideas by the various distinguished participating scientists (17 members and 12 guests).

The rapidly increasing importance of local and general cold injury is clearly set forth in the diversified subjects discussed. Detailed

August 1957)

REVIEWS OF RECENT BOOKS

1217

clinical and experimental data and opinions on frostbite—at times rather controversial—are presented in the first eight chapters, stimulated largely by experiences in World War II and the Korean conflict.

The last four chapters appear to this reviewer as even more timely and provocative: Resuscitation of Hypothermic Supercooled and Frozen Mammals; Blockade Techniques as Protective Measures Against Ventricular Fibrillation During Hypothermia; Clinical Application of Hypothermia During Open Heart Surgery and Cerebral Studies During Local and General Hypothermia. The vital implications of these basic and clinical researches are obvious in the light of recent rapid advances in cardiac surgery and prospective advances in neurosurgery.

The only criticism of this book is considered to be the delay in its publication since this Fourth Conference on Cold Injury was held in November 1955 whereas recent newspaper reports have already appeared on the Fifth Conference on Cold Injury held near Fairbanks, Alaska.

This volume is especially recommended to interested physiologists and pathologists for the experimental designs described and results achieved as well as to the cardiologist and thoracic surgeon for a view of the careful basic work required for the expanding horizons in this field. —H. LEONARD JONES Capt. MC USA

THE YEAR BOOK OF RADIOLOGY (1956-1957 Year Book Series) Radiologic Diagnosis, edited by John Floyd Holt M.D., and Fred Jenner Hodges M.D. Radiation Therapy, edited by Harold W. Jacox M.D. and Merton M. Kligerman M.D. 430 pages illustrated. The Year Book Publishers, Inc. Chicago Ill. 1957. Price \$9.

This is a well organized book of abstracts of important articles in radiology selected from American and foreign journals published between June 1955 and June 1956. The reviews are concise, clearly stated and excellent summaries of pertinent information contained in the originals.

The first section of the book deals with diagnostic and therapeutic radiological advances and the second with radiologic therapy. This latter part includes some interesting articles on hazards of radiation and radiobiology, which has been so well publicized in the lay press recently. The articles in both sections are presented in a logical, orderly fashion by systems such as head and neck, chest, gastrointestinal tract, spine and extremities and genitourinary tract. This makes it easy to locate articles on a particular system.

This excellent book is a must for radiologists as a source of ready reference. The specialist in other fields would do well to review the articles that are related to his particular specialty.

—JAMES M. KEEGAN Maj. USAF (MC)

**DISCUSSIONS ON CHILD DEVELOPMENT** *A Consideration of the Biological Psychological and Cultural Approaches to the Understanding Of Human Development and Behaviour* edited by J. M. Tanner M D Ph D D P M and Barbel Inhelder Volume I The Proceedings of the First Meeting of the World Health Organization Study Group on the Psychobiological Development of the Child Geneva 1953 240 pages illustrated Volume II The Proceedings of the Second Meeting of the World Health Organization Study Group on the Psychobiological Development of the Child London 1954 270 pages illustrated International Universities Press Inc New York N Y 1957 Price \$10 for set of two volumes

The Mental Health program of the World Health Organization (WHO) was started in 1949 and since that time there has been much effort on the part of the Expert Committee on Mental Health in the Direction of survey co ordination and stimulation of research In 1953 the WHO Study Group on the psychobiological development of the child met in Geneva for a week In 1954 the Study Group met for a week in London Their assignment was to discuss the influence of psychological biological and cultural factors in human development and the approaches to these factors for further understanding

Dr Frank Fremont Smith presided at the meetings with Dr G R Hargreaves acting as secretary The proceedings were recorded and later edited The Study Group at both sessions was distinguished international and interdisciplinary in composition John Bowlby in psychoanalysis Jean Piaget Barbel Inhelder and René Zazzo in psychology J M Tanner in human biology Margaret Mead in anthropology Konrad Lorenz in ethology W Grey Walter A Rémond Marcel Monnier and K A Melin in electrophysiology and R R Struthers in research promotion By bringing this group together it was hoped that an opportunity would be provided for the development of mutual understanding between workers in different disciplines and that out of increased understanding would come jointly undertaken research and increased effort to relate the findings of one discipline to those of another Prepared presentations were kept short and were used mainly to stimulate discussions in a particular area In this way the emphasis was placed much more on the listener and his contribution than on the presenting person The discussion was free rapid shifting and wide ranging

Volume I (1953 meeting) The major areas for discussion at this meeting were the physical and physiological aspects of child development Piaget's concepts of the levels of mental development Wallon's descriptions of motor development in early childhood electroencephalographic development of children psychological development of the child psychoanalytic theory and ethology and cross cultural studies as they pertain to the personality development

Volume II (1954 meeting) The discussion in this meeting related to learning theory learning under stress and learning in an immature



## New Books Received

Books received by the *U S Armed Forces Medical Journal* are acknowledged in this department. Those of greatest interest will be reviewed in a later issue.

- THE SPECIALTIES IN GENERAL PRACTICE** edited by *Russell L. Cecil M D* and *Howard F. Conn M D* 2d edition 780 pages illustrated W B Saunders Co Philadelphia Pa 1957
- PRACTITIONERS' CONFERENCES** Held at The New York Hospital Cornell Medical Center Volume 6 edited by *Claude E. Forkner M D F A C P* 378 pages illustrated Appleton-Century-Crofts Inc New York N Y 1957 Price \$6.75
- A MANUAL OF PHARMACOLOGY and its Applications to Therapeutics and Toxicology** by *Toald Solimann M D* 8th edition 1535 pages W B Saunders Co Philadelphia Pa 1957
- CLINICAL PHARMACOLOGY** by *J. Peerman Nesselrod B S M S M Sc (Med) M D F A C S F A P S* 2d edition 296 pages illustrated W B Saunders Co Philadelphia Pa 1957
- PHARMACOLOGY Its Use in Nursing Service** by *Gladys Sellev B S R N Ph D* and *Paul Hanly Furfey Ph D LL D* 4th edition 502 pages illustrated W B Saunders Co Philadelphia Pa 1957
- ORAL MEDICINE** Diagnosis and Treatment by *Lester W. Barker A B D D S M D Sc D* with a Chapter on Oral Cancer by *S. Gordon Castiglione B A B S M D F A C S* 3d edition 558 pages 391 illustrations including 40 subjects in color J B Lippincott Co Philadelphia Pa 1957 Price \$14
- DEVELOPMENTAL ABNORMALITIES OF THE EYE** by *Ida Mann C. B E M A (Oxon) D Sc M B B S (Lond) F R C S (Eng) F R A C S* 2d edition 419 pages illustrated J B Lippincott Co Philadelphia Pa 1957 Price \$15
- FLUID AND ELECTROLYTES IN PRACTICE** by *Harry Staland M D* 2d edition 229 pages illustrated J B Lippincott Co Philadelphia Pa 1957 Price \$6
- BASIC NUTRITION** by *F. W. McHenry M A Ph D F R S. (C.)* 389 pages J B Lippincott Co Philadelphia Pa 1957 Price \$5
- SCOVILLE'S THE ART OF COMPOUNDING** by *Glenn L. Jenkins Don E. Francke Edward A. Becht* and *Glen J. Sperandio* 9th edition 551 pages illustrated The Blakiston Division McGraw Hill Book Co Inc New York N Y 1957 Price \$11
- THE DIAGNOSIS AND TREATMENT OF ENDOCRINE DISORDERS IN CHILDHOOD AND ADOLESCENCE** by *Lauson Wilkins M D* 2d edition 526 pages illustrated Charles C Thomas Publisher Springfield Ill 1957 Price \$17.50
- PRACTICAL REFRACTION** by *Bernard C. Gettes M D* 170 pages illustrated Grune & Stratton Inc New York N Y 1957 Price \$6.50

August 1957)

# NEW BOOKS RECEIVED

1247

MANAGEMENT OF THE PATIENT WITH HEADACHE by Perry S MacNeal  
M D F A C P Bernard J Alpers M D, Sc D (Med) F A C P  
and William R O'Brien M D, F A P A 145 pages Leo & Febiger  
Philadelphia Pa, 1957 Price \$3 50

PRACTICAL CLINICAL PSYCHIATRY by Jack R Ewalt M D Edward A  
Strecker M D Sc D LL D and Franklin G Ebaugh M D 8th  
edition 457 pages The Blakiston Div, McGraw Hill Book Co, loc,  
New York N Y 1957 Price \$8

OBSTETRICAL NURSING by Carolyn Conant Van Blarcom R N Revised by  
Erna Siegel R N B S 4th edition 855 pages illustrated The Mac-  
millan Co, New York N Y, 1957 Price \$6 50

SIGNS AND SYMPTOMS Applied Pathologic Physiology and Clinical Interpre-  
tation edited by Cyril Mitchell MacBryde A B, M D, F A C P  
3d edition 973 pages 191 illustrations and 6 color plates J B Lippin-  
cott Co Philadelphia Pa 1957 Price \$12

CIBA FOUNDATION COLLOQUIA ON ENDOCRINOLOGY, Volume 10 Regu-  
lation and Mode of Action of Thyroid Hormones Editors for the Ciba  
Foundation G C W Wolstenholme O B E M A M B Ch  
and Elaine C P Millar A H & C. A R I C 311 pages 114 illus-  
trations Little Brown & Co Boston Mass 1957 Price \$8 50

CIBA FOUNDATION SYMPOSIUM ON THE CHEMISTRY AND BIOLOGY OF  
PURINES Editors for the Ciba Foundation G C W Wolstenholme  
O B E M A M B Ch, and Cecilia M O Connor B Sc 327  
pages with 124 illustrations and structural formulae Little Brown &  
Co Boston Mass 1957 Price \$9

THE NURSE AND THE OUTPATIENT DEPARTMENT by Audrey Windemuth  
R N B S 580 pages The Macmillan Co New York N Y 1957  
Price \$6 50

THE TREATMENT OF WOUND SHOCK The Wound Shock Working Party  
Medical Research Council Memorandum No 34 39 pages Published  
by Her Majesty's Stationery Office London E C 1 England 1957  
Price 3s 6d net

GOUT by John H Talbot A B M D D Sc (Hon) 205 pages illustrated  
Grune & Stratton Inc, New York N Y 1957 Price \$6 75

MAGNETIC REMOVAL OF FOREIGN BODIES The Use of the Alnico Magnet  
in the Recovery of Foreign Bodies from the Air Passages the Esopha-  
gus Stomach and Duodenum by Murdock Equen M D F A C S.  
94 pages illustrated Charles C Thomas Publisher, Springfield, Ill  
1957 Price \$4 50

LAW EVERY NURSE SHOULD KNOW by Helen Greigbion B S N R N,  
A B A M J D 197 pages W B Saunders Co Philadelphia, Po  
1957

PRACTICAL OTOLARYNGOLOGY by Gertrude Ward McAuliffe M D, F A C S  
F I C S 320 pages illustrated Landsberger Medical Books, Inc, 1957  
Distributed by The Blakiston Division McGraw Hill Book Co New York  
N Y Price \$7

The Early Diagnosis and Treatment of ACOUSTIC NERVE TUMORS by  
J Lawrence Pool M D and Arthur A Pava M D American Lecture  
Series Publication No 303 A Monograph in American Lectures in  
Surgery, edited by Michael E DeBakey M D, and R Glen Spurling  
M D Neurosurgery Division edited by Barnes Woodhall M D 161  
pages illustrated Charles C Thomas Publisher Springfield Ill,  
1957 Price \$5 50



**CLINICAL APPLICATIONS OF SUGGESTION AND HYPNOSIS** by William T. Heron M. A. Ph. D. 3d edition 165 pages Charles C. Thomas Publisher Springfield Ill. 1957 Price \$3.75

**THE FAMILY IN PSYCHOTHERAPY** by C. F. Midefort M. D. 203 pages The Blakiston Division McGraw-Hill Book Co. Inc. New York N. Y. 1957 Price \$6.50

**PSYCHIATRIC RESEARCH REPORTS No. 7 of the American Psychiatric Association** edited by Members of the Committee on Research 1955 1956 Jacques S. Gottlieb M. D. Chauman Stress Experimental psychology Child psychiatry Papers presented at the Regional Research Conference held under the joint auspices of the American Psychiatric Association and McGill University Montreal Quebec Canada 18-19 November 1955 Published by the American Psychiatric Association Washington D. C. April 1957 Price \$2

**OBESITY Its Cause Classification and Care** by E. Philip Gelvin M. D. F. A. C. P. and Thomas H. McGuckack M. D. F. A. C. P. 146 pages Paul B. Hoeber Inc. Medical Book Department of Harper & Brothers New York N. Y. 1957 Price \$3.50

**CRYPTORCHISM** by Charles W. Charny M. D. and William Wolf, M. D. 140 pages illustrated Paul B. Hoeber Inc. Medical Book Department of Harper & Brothers New York N. Y. 1957 Price \$5.85

**WILLIAM HARVEY His Life and Times His Discoveries His Methods** by Louis Chauvois Foreword by Sir Zachary Cope 271 pages illustrated Philosophical Library Inc. New York N. Y. 1957 Price \$7.50

**CLINICAL PEDOONTOLOGY** by Sidney B. Finn D. M. D. M. S. and 7 contributors 664 pages illustrated with 275 figures W. B. Saunders Co. Philadelphia Pa. 1957

**TEXTBOOK OF PATHOLOGY With Clinical Applications** by Stanley L. Robbins M. D. 1351 pages illustrated W. B. Saunders Co. Philadelphia Pa. 1957

**ANNALS OF THE NEW YORK ACADEMY OF SCIENCES Volume 67 Art. 8** pages 209-446 April 19 1957 Editor-in-Chief Otto V. St. Whitelock. Viruses in Search of Disease 237 pages illustrated The New York Academy of Sciences New York N. Y. 1957 Price \$5

**ANNALS OF THE NEW YORK ACADEMY OF SCIENCES Volume 67 Art. 9** pages 447-670 May 24 1957 Editor-in-Chief Otto V. St. Whitelock. Unstable Chemical Species Free Radicals Ions and Excited Molecules 223 pages illustrated The New York Academy of Sciences New York N. Y. 1957 Price \$4

**ANNALS OF THE NEW YORK ACADEMY OF SCIENCES Volume 67 Art. 10** pages 671-894 May 9 1957 Editor-in-Chief Otto V. St. Whitelock. Meprobamate and Other Agents Used in Mental Disturbances 223 pages illustrated The New York Academy of Sciences New York N. Y. 1957 Price \$4

**ANNALS OF THE NEW YORK ACADEMY OF SCIENCES Volume 67 Art. 11** pages 897-982 May 24 1957 Editor-in-Chief Otto V. St. Whitelock. Man-Made Fiber Progress 85 pages illustrated The New York Academy of Sciences New York N. Y. 1957 Price \$3

# UNITED STATES ARMED FORCES MEDICAL JOURNAL

*Published Monthly by  
the Armed Forces Medical Publication Agency  
Department of Defense*



*Editor*

CAPTAIN BENNETT F AVERY, MC, USN

*Associate Editors*

COLONEL ROBERT S ANDERSON, MC, USA

COLONEL ROBERT J BENFORO, USAF (MC)

UNITED STATES  
GOVERNMENT PRINTING OFFICE  
WASHINGTON 1957

THE PRINTING OF THIS PUBLICATION HAS BEEN APPROVED BY  
THE DIRECTOR OF THE BUREAU OF THE BUDGET, 20 FEB 1956

# Monthly Message

## KNOWLEDGE—LOOSE TALK

You as doctors are frequently called upon by your patients in casual conversation and with lawyers to express thoughtful and helpful opinions. The accomplishment of this in both a responsive and responsible manner requires general knowledge in broad education, an inquisitive mind, willingness to continue to develop your own intellectual catholicity, and the avoidance of garrulousness. This becomes increasingly important with the increasing development and use of radioactive substances.

For example

(1) A man working in one of the large centers developed infectious mononucleosis. A doctor was called upon to explain this and to back up the contention of the wife that this could be caused by radiation. He was confronted with all sorts of clippings from popular magazines and news papers.

(2) The second case is that of the baby born with cleft palate. The parents immediately propounded the same question to the doctor.

In both instances the doctors did not have self assurance in their own knowledge to state definitely that both of these conditions were common even long before the days of radiation exposure. These examples illustrate the danger of wishing to place the blame for ordinary conditions on radiation, one as to causation of radiation illness and the other as to its effect upon genetics.

Knowledge will bring assurance to the physician and reassurance to his patient. Conversation, loose talk and uncritical opinions will spread alarm and anxiety and eventually will cause trouble for both the physician and his patient.

*Frank B Berry*

FRANK B BERRY M D  
Assistant Secretary of Defense  
(Health and Medical)

# Table of Contents

	Page
Histaminergic Nerve Effects in Relation to Peptic Ulcer Preliminary Experiments on Dogs— <i>Peter H. Bulle and Margaret A. Avery</i> ..	1249
Special Care Ward for Critically Ill Surgical and Postoperative Patients— <i>Robert M. Hardaway</i>	1258
Nontuberculous Chest Cases Originally Diagnosed as Tuberculous A Five-Year Study— <i>James M. Schless and James A. Wier</i>	1261
Study of 507 Patients Discharged From a Tuberculosis Service A Year's Experience of a Novel Hospital— <i>John A. C. Gray and George E. Spencer</i>	1281
Increasing Dental Speeds— <i>Frank J. Brauer</i> ..	1291
Redundancy of the Sigmoid Colon— <i>Peter Zanca</i>	1303
The Sigmoid Segment as a Bladder Substitute— <i>John W. Simpson, Warner F. Bowers and Claude C. Dodson</i> ..	1311
Carcinoma of the Esophagus Survival and the Folly of "Early Diagnosis"— <i>Eddy D. Palmer</i> ..	1317
Rupture of Previous Cesarean Section Scar in Subsequent Pregnancies Report of Seven Cases— <i>John R. Kane and William S. Baker Jr.</i>	1323
Radiation Hazards and Medical X-Ray Protection in Installations of the U. S. Army Europe— <i>Paul A. Paden</i>	1331
Development of a Therapeutic Community Problems Encountered in Daily Community Meetings— <i>Frank L. Rundle and Dennie L. Briggs</i>	1339
CLINICOPATHOLOGIC CONFERENCE	
U. S. Air Force Hospital Sheppard Air Force Base Tex	1350
SERVICE ARTICLES	
Application of Psychodynamic Principles to Psychotherapy in Military Service— <i>Harry Trosman and I. Hyman Wetland</i> ..	1358
Dental Incident Rate in Parachuting— <i>Robert F. Weber and Robert P. Moss</i>	1363
CASE REPORTS	
Decompression Sickness at Medium Altitude— <i>Stuart A. Schneek</i>	1366
DEPARTMENTS	
A Message From the A. M. A	1371
Deaths	1373
Military Medical Dental Symposium ..	1374
DeWitt Army Hospital Dedicated at Fort Belvoir	1375
Legion of Merit to Three Air Force Officers	1379
Symposium on Military Medical Problems at International College of Surgeons Congress .....	1380

# TABLE OF CONTENTS—Continued

iv

## DEPARTMENTS—Continued

Annual Meeting of Military Surgeons in Washington	D C	October	1381
28-30			1383
Officers Certif ed by Specialty Boards			1385
BOOKS			1402
Reviews of Recent Books			
New Books Recesi ed			

## Foreword

The United States Armed Forces Medical Journal is the medium for disseminating information of administrative and professional interest to all medical personnel of the Department of Defense. The Assistant Secretary of Defense (Health and Medical) and the Surgeons General of the several services invite all medical officers dental officers Medical Service Corps officers Nurse Corps officers and officers of the Veterinary Corps of the Armed Forces and the medical consultants of the Army Navy and Air Force to submit manuscripts for publication in this Journal.

FRANK B BERRY M D

*Assistant Secretary of Defense (Health and Medical)*

MAJOR GENERAL SILAS B HAYS

*Surgeon General United States Army*

REAR ADMIRAL BARTHOLOMEW W HOGAN

*Surgeon General United States Navy*

MAJOR GENERAL DAN C OGLE

*Surgeon General United States Air Force*

# UNITED STATES ARMED FORCES MEDICAL JOURNAL

Volume VIII

September 1957

Number 9

## HISTAMINERGIC NERVE EFFECTS IN RELATION TO PEPTIC ULCER

*Preliminary Experiments on Dogs*

PETER H. BULLE, M.D.  
MARGARET A. AVERY, M.S.

**E**MOTIONAL stress is known to induce certain somatic changes that may be related to hyperactivity of the sympathetic nervous system.<sup>1-3</sup> In the normal individual, such sympathetic stimulation causes reduction of gastric acid formation or of gastrointestinal motility.<sup>4,5</sup> Clinical observation shows that the peptic ulcer patient under emotional stress experiences an aggravation of his symptoms, usually accompanied by excessive secretion of hydrochloric acid (HCl).<sup>2,6</sup> This difference of organ reaction to sympathetic stimulation in the peptic ulcer patient leads us to assume the existence of a constitutional abnormality in his sympathetic nervous system.<sup>7,8</sup> It is the purpose of this study to elucidate the nature of this abnormal predisposition. Our approach to this problem was based on a number of recent findings:

1. Sympathetic nerve structures were found to contain not only adrenergic, but also histaminergic fibers in varying proportions. The existence of such histaminergic fibers was established with the finding that histamine is present in<sup>9-12</sup> and capable of stimulating<sup>10-13</sup> sympathetic nerves and, conversely, that nerve stimulation leads to peripheral histamine release.<sup>14,15</sup>

From Department of Pharmacology, Georgetown University Medical School, Washington, D. C.

2 Evidence was adduced to show that psychogenic factors may lead to central stimulation of the histaminergic fibers<sup>15</sup>

3 It was found that central stimulation of histaminergic fibers may result also from parenteral administration of histamine<sup>16</sup>

These findings in conjunction with the long established fact that histamine is a powerful stimulant of gastric acid secretion,<sup>17-19</sup> prompted us to investigate the mechanism by which histamine causes gastric hyperacidity

### MATERIALS AND METHODS

For each series of experiments, mongrel dogs weighing about 10 kg were used. HCl secretion in response to intravenously administered histamine phosphate (10 gamma/kg) was measured by sampling gastric juice immediately before and 15 and 60 minutes after the histamine administration. Maximum secretion of HCl should have occurred 15 minutes after the injection of histamine, whereas the effect should have largely disappeared after 60 minutes. Because both free and bound HCl had to be determined individually on the samples, the results are recorded separately in the tables.

The specimens were collected by oral insertion of a rubber tube into the stomach of the experimental animals. Twenty five milliliters of water was injected via this tube and the stomach contents were withdrawn 2 to 3 minutes later. The dogs had received no solid food for 12 hours prior to the procedure. During the testing period they were given only the measured quantities of water by gastric tube. This unvarying procedure was followed with the controls and after (a) sectioning of the cervical spinal cord below the 5th or 6th vertebra, (b) intravenous administration of hexamethonium (10 mg/kg), (c) intravenous administration of chlorpromazine (0.5 mg/kg), and (d) intravenous administration of amphetamino sulfate (0.2 mg/kg). Sectioning of the cervical spinal cord was performed using Pentothal anesthesia and attempts to obtain a histamine response were made 1 hr after the administration of Pentothal Sodium (brand of thiopental sodium).

### RESULTS

On the assumption that in the dog as in man there are constitutional variations in sensitivity to histamine, 12 dogs were tested in a preliminary control series by the procedure outlined above. Only five responded with strong acid secretion of the gastric glands. Detailed findings on these five are shown in table 1. The other seven dogs failed to respond to either 100 gamma or 5 000 gamma of histamine. Accordingly in subsequent series only dogs with demonstrated ability to respond to histamine were used.

Sectioning of the cervical spinal cord abolished the histamine response (table 2). The autonomic ganglionic blockade induced by hexamethonium had the same effect, lasting for 4 to 8 hr (table 3). Chlorpromazine effectively inhibited the histamine response for the duration of 5 to 7 hr (table 4). Amphetamine prevented the histamine effect upon gastric acid secretion for 5 to 7 hr in 5 out of 6 dogs (table 5).

### DISCUSSION

The dogs were accustomed to intubation in order to alleviate their apprehension to this procedure. To obtain relative values for the gastric acidity of the experimental animals, it was necessary to inject a constant amount of water into the stomach, as this organ in the resting state does not contain gastric juice in quantities sufficient for sampling. The cervical spinal cord was severed to obtain complete interruption of all preganglionic sympathetic fibers. Care was taken to leave the phrenic nerves intact. Diaphragmatic breathing was found sufficient for the maintenance of adequate oxygenation. The dogs were anesthetized with Pentothal Sodium, because this ultrashort acting barbiturate in the dosage used does not interfere with impulse transmission through autonomic ganglia. One hour was allowed to elapse between the surgical and the testing procedures to preclude experimental errors from possible effects of the anesthetic or trummitization.

Our experimental finding that surgical interruption or pharmacologic blockade of impulse transmission through the sympathetic nervous system abolished the histamine effect on the gastric glands indicates (a) that the centrally originating sympathetic structures which innervate the stomach contain histaminergic fibers and (b) that these fibers conduct the central impulses to the stomach. The phenomenon that in the normal individual stimulation of the sympathetic nervous system (through emotional stress) leads to an adrenergic response (reduction of gastric acidity or motility) seems to indicate that, normally, the adrenergic fibers predominate over the histaminergic fibers. As the peptic ulcer patient responds to emotional stress with an overproduction of HCl (a histaminergic reaction), it may be assumed that in his case the histaminergic fibers prevail in the sympathetic structures innervating the stomach. It is suggested that this particular anomaly represents a constitutional predisposition which plays a role in peptic ulcer formation. Two factors have to concur in the development of the disease, the constitutional and the psychogenic. Consequently, treatment of peptic ulcer may be approached in two ways, (a) by removing emotional stress, and (b) by correcting the histaminergic predominance.



TABLE 1 Gastric acid response of 5 out of 12 dogs to repeated intravenous injections of 100  $\mu$ g histamine (acidity expressed in degrees). The remaining 7 dogs gave no response

Time after hourly injections	Dog No 1		Dog No 2		Dog No 6		Dog No 7		Dog No 12	
	Free	Bound	Free	Bound	Free	Bound	Free	Bound	Free	Bound
(Normal)	0	6.6	0	3.0	0	1.0	1.0	4.0	9	20
(1st hour)										
15 minutes	7.0	9.0	4.8	14.4	5.0	5.0	0	3.0	14	25
60 minutes	0	5.0	6.6	14.2	0	3.0	0	3.0	10	15
(2d hour)										
15 minutes					16.0	4.0	6.0	4.5	13	13
60 minutes					0	1.0	0	2.0	17	14
(3d hour)										
15 minutes					4.0	3.0	17.0	2.0	15	11
60 minutes									9	50

TABLE 2 Gastric acid response to intravenous injections of histamine after section of cervical spinal cord (acidity expressed in degrees)

Time after injection	Dog No 6		Dog No 13		Dog No 15		Dog No 18		Dog No 19	
	Free	Bound	Free	Bound	Free	Bound	Free	Bound	Free	Bound
(Normal)	0	1.0	0	5.0	0	2.0	0	2.0	0	38.0
(100 $\mu$ g hist.)										
15 minutes	0	1.0	0	11.4	0	2.0	0	2.0	0	28.0
30 minutes	0	1.0	0	2.0						
60 minutes	0	2.0								
(500 $\mu$ g hist.)										
15 minutes	0	2.0			0	2.0	0	1.0	0	13.0
(1,000 $\mu$ g hist.)										
15 minutes			0	6.0	0	1.1	0	2.0	0	5.0

TABLE 3 Gastric acid response to repeated intravenous injections of 100  $\mu$ g histamine following hexamethonium block (10 mg/kg 1 V) (acidity expressed in degrees)

Time after hourly injections	Dog No 6		Dog No 7		Dog No 14		Dog No 15		Dog No 18	
	Free	Bound	Free	Bound	Free	Bound	Free	Bound	Free	Bound
(Normal)	0	10	20	330	25	35	0	85	0	12
(1st hr)										
15 minutes	0	10	0	90	0	20	0	25	0	30
60 minutes	0	10	0	105	0	10	0	15	0	180
(2d hr)	Three hour rest period				0	12	Three-hour rest period			
15 minutes					0	15				
60 minutes					0	15				
(3d hr)					0	15				
15 minutes					0	15				
60 minutes					0	15				
(4th hr)					0	375				
15 minutes					0	25				
60 minutes					0	25				
(5th hr)										
15 minutes	0	10	0	70	0	10	115	189	0	260
60 minutes	0	10			0	10				
(6th hr)										
15 minutes	0	20	10	110			100	130	0	110
60 minutes	25	0	20	350			140	40	0	140
(7th hr)										
15 minutes	180	90	18	78					20	80
60 minutes	40	24	0	16					0	35
(8th hr)										
15 minutes			77	440					120	170
60 minutes			75	500					0	100

To test the efficacy of drugs that could be expected to control the neural imbalance the action of hexamethonium, chlorpromazine, and amphetamine (all neurotropic agents) upon gastric acid secretion was studied. The hexamethonium effect on the histamine induced HCl response may be attributed to its sympathetic, rather than its parasympathetic, blocking property, as atropine (a parasympathetic inhibitor) is known not to inter-

TABLE 4 Gastric acid response to repeated intravenous injections of 100 µg histamine following 5 mg chlorpromazine I.V. (acidity expressed in degrees)

Time (after histamine)	Dog N 6		Dog N 7		Dog N 12		Dog N 15		Dog N 19		Dog N 20		
	F	Bound	Free	Bound	F	Bound	F	Bound	Free	Bound	Free	Bound	
(Normal)	85	35	30	20	0	10	0	40	25	50	0	20	
(1 h)													
15 min	180	45	10	20	40	40	0	50	0	150	0	40	
60 min	10	30	0	10	0	10	0	30	70	160	0	30	
(2d h)	1-h period				5-h period	1-h period							
(3d h)													
15 min	120	40	0	20		0	10	20	40	0	30		
0 min	0	30	50	10		0	10	60	110	20	40		
(4 h h)													
15 min	0	25	10	20	0	15	30	70	10	50			
60 min			60	30			0	20	30	20			
(5 h & 6 h h)	1-h period				5-h period	2-h period							
(7 h h)													
15 min	20	45	0	30		20	30	0	20	0	60	0	40
60 min						0	10			0	20	36	36
(8 h h)													
15 min					10	70			0	40	20	60	
60 min					0	20			0	10	120	30	
(9h h)													
15 min					0	50			0	20	90	20	

fered with that histamine action<sup>20-22</sup>. Hexamethonium as a non specific autonomic ganglionic blocking agent, seems to be of limited therapeutic value however it should be useful, together with atropine as a diagnostic aid for the differentiation between histaminergic hyperacidity and cholinergic (food related) acidity. The finding that chlorpromazine prevented the histamine induced

gastric acid secretion indicates that this agent is capable of inhibiting central histamine effects, a property which apparently is not shared by other synthetic antihistaminics<sup>20, 21-25</sup>. The drug seems particularly suited for the treatment of peptic ulcer, because as a tranquilizing agent it has the additional advantage of

TABLE 5 Gastric acid response to repeated intravenous injections of 100 µg histamine following 2 mg amphetamine i.v. (acidity expressed in degrees)

Time after hourly injections	Dog No. 6		Dog No.		Dog No. 12		Dog No. 13		Dog No. 15		Dog No. 18	
	Free	Bound	Free	Bound	Free	Bound	Free	Bound	Free	Bound	Free	Bound
(Norm 1)	16.0	4.5	3.5	3.5	11.0	8.0	0	1.5	0	4.0	0	2.5
(1st hr)												
15 minutes	17.5	5.0	10.0	4.5	17.0	9.0	0	1.0	0	4.0	0	3.5
60 minutes	3.0	4.0	0	10.0	10.0	4.0	1.5	2.0	0	3.0	0	2.0
(2d hr)												
15 minute	6.0	5.0	2.0	6.0	10.0	4.0	0	1.0	0	7.0	7.0	3.0
60 minute	3.0	6.0			11.0	5.0	1.0	1.0	0	1.5	0	1.0
(3d hr)												
15 minutes	9.0	5.0	10.0	15.0	3.0	3.0	0	2.4	1.4	8.4	0	2.0
60 minutes	2.0	3.0	12.0	5.0	6.0	2.0	0	1.0	0	1.5	0	2.0
(4th hr)												
15 minutes	2.0	2.0	17.0	3.0	9.0	3.0	1.0	2.5	0	14.0	3.0	2.0
60 minutes	3.6	2.4	13.5	3.0	6.0	2.0	0	0.5	0	2.0	0	1.0
(5th hr)												
15 minutes	2.5	2.5	15.0	3.0	6.0	7.0	0	1.5	0	1.5	0	3.0
60 minutes	0	2.0	7.0	4.0	1.0	1.0	3.0	3.0	0	2.0	0	1.0
(6th hr)												
15 minutes	0	2.0	4.0	2.0	6.0	5.0			0	2.0	0	2.0
60 minutes	4.0	5.0			5.0	5.0			0	1.0	0	2.0
(7th hr)												
15 minutes	5.5	3.5			2.0	5.0			0	3.0	0	1.0
60 minutes												

reducing the adverse psychogenic stimulation. Amphetamine, an adrenaline congener, was studied as it could be expected, due to its sympathomimetic properties, to prevent the histamine effect upon the gastric glands by depressing their activity<sup>26-29</sup>. The experimental results obtained with amphetamine give indica-

1256 U S ARMED FORCES MEDICAL JOURNAL

tion of its usefulness as a therapeutic agent in peptic ulcer particularly as it is known to have potent mood elevating properties and thus may alleviate the emotional stress as well

SUMMARY

... provokes gastric acid secretion ... the histamine

## SUMMARY

**SUMMARY**

The mechanism by which histamine provokes gastric acid secretion was studied in the dog. It was found that the histamine induced gastric acid response can be abolished (a) by sectioning of the preganglionic sympathetic fibers and (b) by autonomic ganglionic blockade with hexamethonium. It was postulated that the sympathetic structures innervating the stomach carry histaminergic as well as adrenergic fibers and that the constitutional predisposition for peptic ulcer consists in a predominance of the histaminergic fibers. Based on clinical evidence it was concluded that for the development of the disease in man a psychogenic factor has to concur with the constitutional anomaly. Chlorpromazine and amphetamine were tested and found to effectively control histaminergic acid formation. Their possible therapeutic indication was discussed.

The authors are grateful to John A. Jereb and his assistants for technical assistance.

**ACKNOWLEDGMENT** The authors are grateful to John A. Jereb and Lawrence F. Sancilio for their technical assistance.

## REFERENCES

- ACKNOWLEDGMENT The authors wish to acknowledge the technical assistance of Miss F. S. S. for their technical assistance.
- REFERENCES
1. M. H. and F. L. E. R. O. pre s nt influence of symp thetic nerv s on gastric acid ty Brit J Surg 16 283-307 Oct. 1928.  
2. Ornd tli J R. B tgh G S a d lry A. C. P ptis ulcer and anx ty mpl x f ilur of pharmacologic ally sust i ed hyp tscret n d hypermotility f st mach to produ chronic s ur ale t ad es Surg Gynec & Obst 61 162-168 Aug 1935  
3. Benn t T I and Ven hl s J F Effect of emot ns on a sur etret on and motility n human being Brit M J 2 662 Oct 30 1920  
4. Cannon W B The M chemical Factors of Digest on. E. Arn ld L nd 1911  
5. Och ner A. P ptic ale t (Ed torial) Surgery 17 770-771 M y 1945  
6. K pl n H P y hos matic conc pt f peptic ulcer J Nerv & Ment Dis. 123 93 111 F b 1956.  
7. DuBarry J J and Pas C. L. ulcere d s st f m ladic obligat urem at heted t u hered to rec d pred pos t on Presse med. 64 1857 1858 No 10 1956.  
8. Gaddum J H B ttr s zum H t m aprohl. Acta neuroveg 4 268-275 F b 30 1943  
9. von Euler U S H stamin ns sp cif c constituent of certa n auto m c nerv fibr s Acta physiol scandnav 19 85-93 1949  
10. K w tk w kl H H st mnc n n rous tissa J Physiol 102 32-41 Jun 30 1943  
11. Kon tt H Effect f h tamin on t l ted symp thetic gangl n J M S n m Hosp 19- 149-153 May-June 1952  
12. Trendelenburg U Mod ft att n of tran m sion through aper or cervical gangl n of cat J Physiol 132 529-541 June 28 1956.  
13. L er L H Cn a enus h tam n react s t t of periphe l nerve fun t n J A. M. A. 110 2136-2138 Jun 25 1938  
14. v n Euler U S nd Astr m A. L h t n of h st m n and ymp th by t mlat n f l ed pl n nerv fr m rcl Acta physiol scandnav 16 97 104 1948.  
15. Bull P H R I f cert n a uro-humo n c p im t l hypert n n. To b publ hed n Am. J M S c

- 16 Bulte P H Possible etiology of bronchial asthma To be published
- 17 Ashford C A Heller H and Smart G A Action of histamine on hydrochloric acid and pepsin secretion in man *Brit J Pharmacol* 4 153 156 June 1949
- 18 Isms A M and Hirston B T Ulcer which appeared in stomach of man receiving histamine intravenously *Gastroenterology* 6 449-451 May 1946
- 19 Larrabee M G and Holaday D A Depression of transmission through sympathetic ganglia during general anesthesia *J Pharmacol & Exper Therap* 105 400-408 Aug 1952
- 20 Code C F The inhibition of gastric secretinn *Pharmacol Rev* 3 59-106 Mar 1951
- 21 Baronolsky I D Friesen S Sanchez-Palomera F Cole F and Wankensreen D H Vagotomy fails to protect against histamine-provoked ulcer *Proc Soc Exper Biol & Med* 62 114 118 June 1946
- 22 Janowitz H D and Hollander F Effect of atropine on histamine-stimulated gastric secretion in dog *Am J Physiol* 186 373 376 Sept 1956
- 23 Crane J T Lindsay S and Dailey M E Attempt to prevent histamine-induced ulcers in guinea pigs with benadryl (beta dimethylaminoethylbenzhydral ether hydrochloride) *Am J Digest Dis* 14 56 57 Feb 1947
- 24 Ashford G A Heller H and Smart G A Effect of antihistamine substances on gastric secretion in man *Brit J Pharmacol* 4 157 161 June 1949
- 25 Hartman S A and Moore D M Effect of tripeleminamine hydrochloride (pyril benzamine) on gastric acidity of patients with peptic ulcer *Am J Digest Dis* 15 271 275 Aug 1948.
- 26 Hatties E H Effect of noradrenaline on gastric secretory response to histamine in dog *J Physiol* 133 498 505 Sept 1956
- 27 Forreast A P M and Code C F Inhibitory effect of epinephrine and norepinephrine on secretion induced by histamine in separated pouches of dogs *J Pharmacol & Exper Therap* 110 447 450 Apr 1954
- 28 Hess W R and Gundlach R Der Einfluss des Adrenalins auf die Sekretion des Magensaftes *Pflügers Arch* 185 122-136 1920
- 29 Goodman L S and Gilman A *The Pharmacological Basis of Therapeutics* 2d edition Macmillan Co New York N Y 1955 p 395

tion of its usefulness as a therapeutic agent in peptic ulcer, particularly as it is known to have potent mood elevating properties and thus may alleviate the emotional stress as well

## SUMMARY

The mechanism by which histamine provokes gastric acid secretion was studied in the dog. It was found that the histamine induced gastric acid response can be abolished (a) by sectioning of the preganglionic sympathetic fibers and (b) by autonomic ganglionic blockade with hexamethonium. It was postulated that the sympathetic structures innervating the stomach carry histaminergic as well as adrenergic fibers and that the constitutional predisposition for peptic ulcer consists in a predominance of the histaminergic fibers. Based on clinical evidence, it was concluded that for the development of the disease in man a psychogenic factor has to concur with the constitutional anomaly. Chlorpromazine and amphetamine were tested and found to effectively control histaminergic acid formation. Their possible therapeutic indication was discussed.

ACKNOWLEDGMENT The authors are grateful to John A. Jacob and Lawrence F. Sancilio for their technical assistance.

## REFERENCES

1. Miller, H. and Flint, E. R. Dependent influence of sympathetic nerves on gastric acidity. *Brit J Surg* 16: 283-307 Oct 1928.
2. Orndorff, J. R., Bergh, G. S., and Ivy, A. C. Peptic ulcer and anxiety complex: a study of pharmacologic history and hypomotility of stomach to produce gastric ulcer. *Am J Surg* 61: 162-168 Aug 1935.
3. Bennett, T. L., and Venblom, J. F. Effect of emotions on gastric secretion and motility in human beings. *Brit J Surg* 2: 662 Oct 30 1920.
4. Cannon, W. B. *The Mechanical Factors of Digestion*. E. Arnold, London 1911.
5. Ochsner, A. Peptic ulcer (Editorial). *Surgery* 17: 770-771 May 1945.
6. Kipling, H. Psychosomatic concept of peptic ulcer. *J Nerv & Ment Dis* 123: 93-111 Feb 1956.
7. DuBarry, J. J., and Pitt, C. L. Ulcer and gestif. *Med Biol & Soc Nat Hered* 1956.
8. Gaddum, J. H. B. The gastric problem. *Acta neurologica* 4: 268-275 Feb 1952.
9. Euler, U. S. Histamine as specific constituent of certain autonomic nervous fibers. *Acta physiologica Scandinavica* 19: 85-93 1949.
10. Krawkowski, H. Histamine in nervous tissue. *J Physiol* 102: 32-41 Jun 1952.
11. Krawkowski, H. Effect of histamine on isolated sympathetic ganglion. *Hosp* 19: 149-153 May Jun 1952.
12. Trufelburg, U. Modification of histamine test of peripheral function. *Acta J Physiol* 132: 529-541 Jun 28 1956.
13. L. H. Cattaui, A. L. B. and A. M. A. L. B. Histamine and sympathetic stimulation. *Acta physiologica Scandinavica* 16: 97 Jun 25 1938.
14. Euler, U. S., and A. M. A. L. B. Histamine and sympathetic stimulation. *Acta physiologica Scandinavica* 16: 97 Jun 25 1938.
15. Bull, P. H. Role of histamine in peptic ulcer. *Am J Med Sci* 104: 1948.

- 16 Bulle P H Possible etiology of bronchial asthma To be published
- 17 Ashford C A Heller H and Smart C A Action of histamine on hydrochloric acid and pepsin secretion in man *Brit J Pharmacol* 4 153 156 June 1949
- 18 Iams A M and Horton B T Ulcer which appeared in stomach of man receiving histamine intravenously *Gastroenterology* 6 449-451 May 1946
- 19 Larrabee M G and Holaday D A Depression of transmission through sympathetic ganglia during general anesthesia *J Pharmacol & Exper Therap* 105 400-408 Aug 1952
- 20 Code C F The inhibition of gastric secretion *Pharmacol Rev* 3 59-106 Mar 1951
- 21 Baronofsky I D Friesen S Sanchez-Palomera E Cole F and Wangersteen O H Vagotomy fails to protect against histamine-provoked ulcer *Proc Soc Exper Biol & Med* 62 114 118 June 1946
- 22 Janowitz H D and Hollander F Effect of atropine on histamine-stimulated gastric secretion in dog *Am J Physiol* 186 373 376 Sept 1956
- 23 Crane J T Lindsay S and Dailey M E Attempt to prevent histamine-induced ulcers in guinea pigs with benadryl (beta dimethylaminoethylbenzhydral ether hydrochloride) *Am J Digest Dis* 14 56 57 Feb 1947
- 24 Ashford G A Heller H and Smart G A Effect of antihistamine substances on gastric secretion in man *Brit J Pharmacol* 4 157 161 June 1949
- 25 Hartman S A and Moore D M Effect of tripeleminamine hydrochloride (pyril benzamine) on gastric acidity of patients with peptic ulcer *Am J Digest Dis* 15 271 275 Aug 1948.
- 26 Harries E H Effect of noradrenaline on gastric secretory response to histamine in dog *J Physiol* 133 498 505 Sept 1956
- 27 Forrest A P M and Code C F Inhibitory effect of epinephrine and norepinephrine on secretion induced by histamine in separated pouches of dogs *J Pharmacol & Exper Therap* 110 447 450 Apr 1954
- 28 Hess W R and Gundlach R Der Einfluss des Adrenalins auf die Sekretion des Magensaftes *Pflügers Arch* 185 122 136 1920
- 29 Goodman L S and Gilman A *The Pharmacological Basis of Therapeutics* 2d edition Macmillan Co New York N Y 1955 p 395



tion of its usefulness as a therapeutic agent in peptic ulcer, particularly, as it is known to have potent mood elevating properties and thus may alleviate the emotional stress as well

# SUMMARY

The mechanism by which histamine provokes gastric acid secretion was studied in the dog. It was found that the histamine induced gastric acid response can be abolished (a) by sectioning of the preganglionic sympathetic fibers and (b) by autonomic ganglionic blockade with hexamethonium. It was postulated that the sympathetic structures innervating the stomach carry histaminergic as well as adrenergic fibers and that the constitutional predisposition for peptic ulcer consists in a predominance of the histaminergic fibers. Based on clinical evidence, it was concluded that for the development of the disease in man a psychogenic factor has to concur with the constitutional anomaly. Chlorpromazine and amphetamine were tested and found to effectively control histaminergic acid formation. Their possible therapeutic indication was discussed.

ACKNOWLEDGMENT The authors are grateful to John A. Jereb and Lawrence F. Sanctilio for their technical assistance

# REFERENCES

1. M. H. d. Flat E. R. D. pte snt nll enc of ymp th tic n rves n gastric acid ty. *Brit J Surg* 16 283-307 Oct 1928.
2. Orndorff J. R. B. G. S. and Ivy A. C. P. tic ulcer and an ery com l x f lux of pharms of s str c ul er in dogs. *Surg Gynec & Obst* 61 162-168 Aug 1935
3. Ben et T. I. and Ven blea J. F. Effe t of mor us on gastr c secreti n and m til ty n huma b ng. *Brit M. J* 2 662 Oct 30 1920
4. Canna W. B. *The Mechanical Factors of Digestion*. E. Arn ld La don 1911
5. Ochsner A. *Peptic ulcer* (Ed t l) *Surgery* 17 770-771 M y 1945
6. Kaplan H. *Psychosomatic aspects of peptic ulcer*. *J Nerv & Ment Dis* 123 93-111 F b 1956.
7. DuBarry J. J. and P s t C. L. ulcer dig stil mal d obl g to rement hered t r h d te s s v d \_ pced spo tion. *Presse med* 64 1857-1858 Nov 10 1956
8. Gaddum J. H. Be trage zum Hist mup blem. *Acta neuroveg* 4 268-275 F b Mar 1952
9. van Eul t U. S. Histamin sp c fi const tue t of cert in autonom c nerv fibres. *Acta physiol scand nav* 19 85-93 1949
10. Kwi tk wsk H. Hist mine n nerv us t ssue. *J Physiol* 102 32-41 Jun 30 1943
11. K ozett H. Effe ct f histam n n as l ted ymp th t g ngl n J. *Mz Sinc H sp* 19 149-153 M y June 1952
12. T end lenburg U. Mod fication f tr n miss on through sup t or c trical g ngl f c. *J Physiol* 132 529-541 June 28 1956
13. L s t L. H. Cut us hist m r cti n a t st f pet pheral n rve functi n. *J A. M. A.* 110 2136-2138 Jun 25 1938
14. van Eul t U. S. and A rom A. L b r t n of hist m ne nd sympath by mula n f l ed plac n res from tti. *Acta physiol scand nav* 16 97 104 1948.
15. Bull P. H. R. I. of c tr n n uro-humo n e p t m ntal hyperten o To b publ h d s. *Am. J. M. Sc*

patients requiring Wangersteen suction, chest drainage, or tracheotomy care are kept on the special care ward as long as need for this care exists. Those with head injuries and other serious injuries are immediately put on the special care ward where observation, maintenance of an airway, et cetera, can be carried out properly. Fluid intake and output, state of consciousness, blood pressure, temperature, pulse, respiration, and other observations are recorded on the patient's chart at the foot of the bed, where they are freely accessible at all times.

The special care ward is headed by a well qualified surgeon who is responsible for all patients. The anesthesiologist sees all postoperative patients and supervises postanesthetic care, ward surgeons from other wards are encouraged to see and follow their cases, each surgeon writes his own postoperative orders, and patients who have been operated on because of orthopedic, urologic, eye, ear, nose, throat, or gynecologic conditions are treated by the respective services, but it is essential that one surgeon have over all responsibility for the ward.

During the past year, about 1,000 acutely or seriously ill and 4,000 postoperative patients have benefited by the facilities of the special care ward at this hospital. During the same period, approximately 400 patients with head injuries, 200 in traumatic shock, 8 with severe gastrointestinal bleeding, and 20 with severe burns were admitted directly to the ward. About 30 tracheotomies were performed on patients with head injuries and severe maxillofacial and cervical trauma. Emergency artificial respiration with intratracheal intubation was carried out on 5 patients. Intravenous cutdowns for polyethylene tubing were done in many cases. Emergency chest drainage was carried out 24 times in patients with traumatic or spontaneous pneumothorax. Immediate aftercare of two patients who received massage for cardiac arrest was accomplished, with survival of both.

Because of the increasing shortage of nurses, all wards can not be completely staffed by nurses, especially at night. By concentrating those patients needing a great amount of nursing care on one ward, as was proposed by Beardsley, Bowen, and Capalbo,<sup>1</sup> isolated patients requiring such care are brought where they can get it. Due to early ambulation, within 24 hours unless contraindicated for a specific reason, patients usually are at least partially ambulant when sent to their own wards, and can assist in their own care. Dressings are removed from most non-drained wounds after 24 hours. This makes for drier, less irritated wounds, better wound observation, better patient minimized dressing procedures on other wards.

Advantages of the special care ward include

1 Expert professional care, as well as special equipment and knowledge of its use are always immediately available to those who need them

2 Close observation of the critically ill surgical patient and recording of important facts are reliably carried out

3 Danger that a remote case might be neglected as a result of shortage of professional help is obviated

4 Professional help may be safely spread thinner on other wards

5 Need for special nurses or attendants for the individual patient is obviated

A separate anesthesia recovery ward is desirable in large hospitals if staffing is possible while the combined type of ward is recommended for the average hospital where expert and adequate staffing of every ward is out of the question. I am convinced that the facilities of our special care ward have saved many lives, prevented many complications, saved the time of professional personnel and contributed to the smooth and uneventful recovery of the average surgical patient.

#### REFERENCE

1. Berdely J M, Bowen J R, and Caplan C J. Centralized treatment for seriously ill surgical patients. J A M A. 162: 544-547 Oct 6 1956

# NONTUBERCULOUS CHEST CASES ORIGINALLY DIAGNOSED AS TUBERCULOUS

## A Five Year Study

JAMES M SCHLESS M D  
JAMES A WIER Colonel MC USA

**B**URKE AND WIER<sup>1</sup> reviewed the nontuberculous cases originally admitted to the tuberculosis service at this hospital in the years 1952 through 1954 and compared this study with similar observations made at another institution some years previously.<sup>2</sup> Their original series of cases has been expanded and brought up to date, so that our present series now covers dispositions from this hospital for the period 1952 through 1956. Insofar as possible, the cases included in the earlier series have been reviewed and certain minor alterations made so that the criteria used in compiling the figures for 1952 through 1954 are the same as those used for 1955 and 1956.

The current discussion is limited to patients in whom a chest abnormality was demonstrated roentgenographically, or in whom other evidence pointed to a chest lesion that was originally diagnosed as either definitely or possibly tuberculous and for which the patient was admitted to the tuberculosis service upon his arrival at this hospital. Certain cases in which the patients had normal chest roentgenograms are included in this study. These mainly fall into the "no pulmonary disease found" final diagnosis group, and include errors in roentgenographic interpretation as well as a fairly good sized group in whom positive bacteriologic findings were reported without any evidence of pulmonary disease. This group will be discussed at greater length farther on in this article.

Exclusive attention will be paid to those conditions that tend to be confused with pulmonary tuberculosis. No consideration will be given to other significant conditions such as diabetes, orthopedic conditions, arteriosclerosis, psychiatric disturbances, and gastrointestinal diseases, which, in some instances, were much more bothersome to both the patient and to the physician than a questionable chest lesion that ultimately proved to be nontuberculous.

<sup>1</sup>From Fitzsimons Army Hospital, Denver, Colo.

Advantages of the special care ward include

- 1 Expert professional care as well as special equipment and knowledge of its use are always immediately available to those who need them
- 2 Close observation of the critically ill surgical patient and recording of important facts are reliably carried out
- 3 Danger that a remote case might be neglected as a result of shortage of professional help is obviated
- 4 Professional help may be safely spread thinner on other wards
- 5 Need for special nurses or attendants for the individual patient is obviated

A separate anesthesia recovery ward is desirable in large hospitals if staffing is possible while the combined type of ward is recommended for the average hospital where expert and adequate staffing of every ward is out of the question. I am convinced that the facilities of our special care ward have saved many lives prevented many complications saved the time of professional personnel and contributed to the smooth and uneventful recovery of the average surgical patient.

#### REFERENCE

- 1 Beardall J M B n J R and Caplan C J C trial and treatment of seriously ill surgical patients J A M A 162 544 547 Oct 6 1956.

note, however, that there has been a steady decline in the percentage of such admissions over each of the five years, starting with 17.7 per cent in 1952 and ending with 13.2 per cent in 1956. This would reflect an over-all increase in diagnostic acumen on the part of the referring physicians and probably indicates better and more complete initial study of patients with chest diseases. There seems to be an increasing awareness of non-tuberculous chest diseases, accompanied by a decreasing inclination to call any obscure chest lesion tuberculosis.

Table 2 shows the final diagnoses in order of frequency in the 851 patients originally admitted to the tuberculosis service who had ultimate nontuberculous diagnoses at discharge. It will

TABLE 2 *Fifteen leading nontuberculous chest diseases in order of frequency originally diagnosed as tuberculosis 1952-1956*

Disease	Number of patients	Per cent
Fibrosis cause undetermined	126	14.8
Pneumonia	88	10.3
Histoplasmosis	79	9.3
Bronchiectasis	66	7.8
Coccidioidomycosis	56	6.6
Pleurisy	48	5.6
Granuloma cause undetermined	38	4.5
Sarcoidosis	36	4.2
Neoplasm of lung, primary	29	3.4
Bronchitis	20	2.3
Abscess of lung	16	1.9
Emphysema, pulmonary	15	1.8
Pulmonary embolism with infarction	12	1.4
Pneumothorax spontaneous	10	1.2
Hemoptysis cause undetermined	10	1.2
Total	649	76.3
Remaining miscellaneous non-tuberculous chest diseases (33 nontuberculous conditions)	91	10.8
No pulmonary disease	95	11.0
Undiagnosed lesions	16	1.9
Grand total	851	100.0

be noted that these 15 conditions account for over three fourths (76.3 per cent) of the entire series. An additional 11 per cent had no pulmonary disease. In 1.9 per cent, no satisfactory diagnosis was ever established, but these cases were presumed to be nontuberculous. The remaining 10.8 per cent, consisting of 91 cases, were divided among 33 other conditions. These were extremely interesting as including infrequently encountered conditions that they do not

trends. Because space will not permit elaboration on every category of diagnosis, these 91 cases will be passed over with no more mention than notation in the tabulation of discharge diagnoses (table 3)

Most of the remaining part of this article will be devoted to a detailed analysis of the 15 most common discharge diagnoses and the group in whom no pulmonary disease was confirmed. Together, these two categories account for 744 out of our 851 cases, or 87.3 per cent of the series. Individual categories of discharge diagnosis will be discussed in order of frequency of the top 15 conditions over the five year period followed by discussion of the "no pulmonary disease" group.

### PULMONARY FIBROSIS AND/OR CALCIFICATION CAUSE UNDETERMINED

Pulmonary fibrosis and/or calcification cause undetermined, is admittedly a wastebasket diagnosis in which 126 cases (14.8 per cent) are included. For the most part these patients showed localized fibrosis with stable lesions, often demonstrable over long periods. These lesions were usually considered clinically insignificant and not of an extent to justify biopsy. Cultures for *Mycobacterium tuberculosis* were obtained routinely and were negative at this installation although some of these patients were originally admitted with a report of a single positive smear or culture which was unconfirmed and considered erroneous in the light of subsequent study. Many of these persons had negative tuberculin skin tests. The importance of tuberculin testing and the "false positive" bacteriologic tests will be discussed in greater length later in this article.

There is no doubt but that some of the lesions included in this group really represent clinically insignificant healed minimal tuberculosis residuals.

It is significant to note the steady decline in the frequency of this diagnosis. In 1952 40 out of 233 cases, or 17.5 per cent, were given this final diagnosis. In 1956 only 6.6 per cent, or 8 out of 121 cases, ended up in this category. This trend can probably be explained by one or more of the following factors: (1) improved diagnostic techniques, (2) willingness to make a diagnosis of fungus infections especially histoplasmosis on the basis of history, roentgenographic appearance and skin and serologic tests without confirmation by surgery, (3) increasing awareness of other conditions such as pulmonary infarction that can produce pulmonary fibrosis and (4) the policy, during the period of this study, of routinely returning military personnel with inactive tuberculosis to a duty status.

At the present time we have no great hesitancy about making a diagnosis of minimal inactive tuberculosis and clearing the

TABLE 3 *Nontuberculous chest diseases in 851 patients originally diagnosed as tuberculosis 1952-1956*

Discharge diagnosis	Total	1952	1953	1954	1955	1956
Total	851	233	204	156	137	121
<i>Infection and sequelae</i>						
Fibrosis and/or calcification pulmonary cause undetermined	126	40	37	27	14	8
Pulmonary mycotic and parasitic disease						
Coccidioidomycosis	56	28	10	7	5	6
Histoplasmosis	79	16	18	15	12	18
Cryptococcosis	1	-	-	-	-	1
Other fungi	2	-	2	-	-	-
Schistosomiasis	1	-	-	1	-	-
Paragonimiasis	1	1	-	-	-	-
Bronchiectasis	66	24	16	11	10	5
Pneumonia	88	34	15	13	17	9
Pleurisy	18	7	6	13	11	11
Bronchitis	20	3	3	4	4	6
Abscess lung	16	3	1	6	5	1
Broncholithiasis	1	-	-	1	-	-
Lymphadenopathy mediastinal	3	3	-	-	-	-
Emphysema pulmonary	15	3	3	3	4	2
Empyema	3	-	2	1	-	-
Granuloma, cause undetermined	38	-	11	7	14	6
Pericarditis (all nontuberculous types)	4	-	3	-	1	-
Pneumoconiosis (silicosis)	6	3	3	-	-	-
<i>Tumors and cysts</i>						
Neoplasm lung primary	29	4	10	8	2	5
Carcinoma, metastatic	1	-	-	-	1	-
Lymphoma	1	-	-	-	1	-
Bronchogenic cyst	4	1	3	-	-	-
Cyst of lung	5	-	1	2	2	-
Osteoma and osteochondroma ribs	1	-	-	-	1	-
Soft tissue tumors chest wall lipoma fibroma, et cetera	1	-	-	-	-	1
Allergic disorders	7	1	1	1	4	-
<i>Congenital anomalies and structural changes</i>						
Achalsia esophagus	1	1	-	-	-	-
Pneumothorax spontaneous	10	-	-	-	-	-



TABLE 3 *Nontuberculous chest diseases in 851 patients originally diagnosed as tuberculosis 1952-1956—Continued*

Discharge diagnosis	Total	1952	1953	1954	1955	1956
<i>Congenital anomalies and structural changes—Continued</i>						
Undiagnosed lesion probably due to agenesis	1			1		
Fibrocystic disease (cystic bronchiectasis)	2					2
<i>Trauma</i>						
Hematoma lung	6	5	1			
Fibrosis of pleura	2	1	1			
Fractured ribs with traumatic pneumonitis	2		1			1
Hemothorax or effusion due to trauma	2			1		1
<i>Foreign bodies aspiration</i>						
Lipoid pneumonia	3	1	1		1	
Foreign body endobronchial retained	1	1				
<i>Blood vascular and circulatory disorders</i>						
Pulmonary embolism with infarction	12	4		1	2	5
Vascular anomaly	2	1	1			-
Hemoptysis cause undetermined	10	2	3	2	1	2
<i>Disease of unknown cause</i>						
Sarcoidosis	36	1	5	12	8	10
Xanthomatosis	1		1			
Eosinophilic pneumonopathy	3			3		
<i>Artifacts extrinsic shadows</i>						
1	1		1			
<i>Collagen diseases</i>						
Periarteritis nodosa	1				1	
Lupus erythematosus disseminatus	1				1	
<i>Combined lesions</i>						
Inactive tuberculosis with other pulmonary disease	8	7			1	
Inactive tuberculosis with extrapulmonary nontuberculous disease	12	4	7		1	
<i>Unclassified and other lesions</i>						
Observation medical pulmonary disease none found	95	31	22	12	12	18
Undiagnosed lesions	16		12	4		

patient for continued duty, whereas formerly such a diagnosis might have unjustly interfered with a man's career and future. In such cases, in earlier years, the inclination would have been to give the man the benefit of the doubt and make some other diagnosis, such as pulmonary fibrosis, because clinically significant tuberculosis could not be proved.

### PNEUMONIA

Pneumonia proved to be the cause of pulmonary lesions in 10.3 per cent of our cases. The range has been 14.6 per cent in 1952, 12.4 per cent in 1955, and 7.4 per cent in both 1953 and 1956. Thus, we have no consistent trend over the past five years. These variations probably depend on the incidences of respiratory infections year by year and locality by locality. It is to be noted that upper lobe pneumonias, especially those of the viral type, can mimic the roentgenographic findings of tuberculosis. It may take many weeks or even a few months to clear a pneumonic infiltration completely. Occasionally, false positive sputum cultures are obtained or transiently positive ones develop as a result of inflammatory erosion of an old tuberculous focus into a bronchus. When such a situation arises, it is easy to see how legitimate confusion can result. Friedländer pneumonia can look like an acute caseous pneumonic process, even showing cavitation on the roentgenogram. *Klebsiella pneumoniae* may easily be missed in the sputum unless specifically suspected and looked for.

Pneumonias not infrequently show uneventful resolution, leaving pseudocavities which may be radiologically indistinguishable from tuberculosis on conventional roentgenograms. Undoubtedly, there will always be a certain residual of cases in which the differential diagnosis cannot be made in a reasonable time with the facilities available at the installation originally seeing the patient. In such a case, an initial admission diagnosis of possible tuberculosis will probably remain justified.

If certain points are remembered, however, some unnecessary diagnoses of tuberculosis, with the attendant trauma and anxiety that this diagnosis always brings, can be eliminated.

- 1 Every infiltration in the upper lobe is not necessarily caused by tuberculosis.
- 2 A reasonable period of observation under appropriate non-tuberculous chemotherapy will frequently give many answers.
- 3 A negative tuberculin skin test adequately done with freshly prepared PPD and repeated on several occasions will, for all practical purposes, exclude the diagnosis of tuberculosis.
- 4 A patient with an acute tuberculous pneumonic process will usually have sputum which is strongly positive for *Mycobacterium tuberculosis*.

tuberculosis. Adequately examined and cultured sputum specimens which are repeatedly negative would argue very strongly against a diagnosis of tuberculosis.

5 In some instances, the more uncommon pneumonias, such as Friedlander pneumonia, should be borne in mind.

### HISTOPLASMOSIS

The diagnosis of histoplasmosis is being made with increasing frequency. The five year average has been 9.3 per cent, in 1956. For the year 1953 to 1956, histoplasmosis held first place in the list of final diagnoses of nontuberculous patients admitted to the tuberculosis service as definite or possible tuberculosis. The chances are that it will remain near the top of the list until awareness of the great differential diagnostic importance of histoplasmosis is a matter of common knowledge.

In early years, biopsy, positive fungus cultures, or high serologic titers were considered necessary to establish this diagnosis. Today we are making the diagnosis more and more on the basis of history, positive skin tests, and roentgenographic findings, especially if the tuberculin is negative.

Coin lesions with definite "target" calcifications or diffusely scattered fine pulmonary calcifications are characteristic of histoplasmosis and in the presence of a positive skin test we are inclined to make this diagnosis without biopsy. We believe that the histoplasmin skin test is very specific for this disease. However, we believe that it is very important that the same syringe is never used for both tuberculin and histoplasmin, inasmuch as residual contamination can produce false positives in either direction. Occasional cross reactions with coccidioidin and blastomycin have been observed.

There is no doubt that in the past many patients were given treatment for tuberculosis when, in reality, they had histoplasmosis. Many of the large number of pulmonary fibrosis and/or calcification, cause undetermined cases of the earlier years would probably be considered as histoplasmosis today. However, roentgenographic findings are not typical and in whom the tuberculin and/or coccidioidin as well as the histoplasmin skin tests are positive.

There will always be patients who have round foci without calcification but who have a positive reaction to the histoplasmin skin test and no documentation as to how long the lesion might have existed. In these cases, of course, thoracotomy for diagnostic purposes continues to be indicated to establish a differential diagnosis between tuberculosis tumors histoplasmosis,

or other diseases caused by fungi. An occasional case will prove to be histoplasmosis in the presence of a negative reaction to histoplasmin. Therefore, unlike the tuberculin skin test, a negative reaction to the histoplasmin skin test does not exclude histoplasmosis with certainty.

### BRONCHIECTASIS

The trend has been a decrease, year by year, in the number of cases of bronchiectasis misdiagnosed as tuberculosis. Certain factors probably explain the increasing frequency of bronchiectasis as a primary diagnosis and, therefore, the decreasing frequency of original misdiagnosis.

1 Awareness that this condition may occur in the upper lobe as cystic bronchiectasis, probably on a congenital basis, or that it may be present as a result of an old or recent bronchoocclusive lesion followed by infection. The roentgenographic findings in such cases can frequently be confused with those in tuberculosis.

2 More routine use of careful skin testing.

3 Awareness of bronchiectasis as a common cause of hemoptysis.

4 More careful history and physical examination, especially the observation of an area of persistent localized rales.

5 Increased routine use of bronchoscopy and bronchography.

Even after taking all of the above factors into consideration, there may be many times when the differential diagnosis is difficult from a roentgenographic point of view. In such cases, the presence of a positive tuberculin skin test and/or a false positive sputum or gastric culture will lead to a very legitimate presumption of tuberculosis.

Thus, we believe that a certain number of patients with bronchiectasis will probably continue to be admitted with their disease diagnosed as possible tuberculosis, no matter how careful the original studies. Careful attention to the various factors outlined above should keep the incidence of this particular diagnostic error to a minimum.

### COCCIDIOIDOMYCOSIS

The number of cases of coccidioidomycosis originally considered as tuberculosis dropped sharply after 1952. Some of this may be due to improved primary diagnosis of coccidioidomycosis. Other cases undoubtedly were included in the "undetermined" group.

Because coccidioidomycosis frequently causes pulmonary lesions, it may easily be confused with tuberculosis.

nection, it is wise to remember that the coecidioidomycosis cavity frequently, though not invariably, tends to be thin walled and that pericavitary reaction is usually much less marked than in tuberculosis. However, coecidioidomycosis can produce in filtrations which roentgenographically are indistinguishable from tuberculosis, and visa versa.

In this disease, the skin test is not as specific as in either histoplasmosis or in tuberculosis. There is a sizable percentage of patients eventually proved to have coecidioidomycosis who have negative skin tests, at least in the usual 1:100 dilution, although some of these will be positive at 1:10 dilution. A patient with a reaction negative to coecidioidin and positive to tuberculin, and with roentgenographic findings compatible as tuberculosis, will, therefore, continue to be considered as tuberculosis on initial evaluation. Even if the reaction to coecidioidin is positive, if the reaction to tuberculin is also positive, and the roentgenographic findings could be compatible with either, there is a legitimate reason to consider tuberculosis until proved otherwise.

The following considerations might help to reduce the incidence of erroneous diagnosis of tuberculosis in cases of coecidioidomycosis.

- 1 The endemic areas comprise a large part of the Southwestern United States. Thus, not only is this disease endemic in the San Joaquin Valley, but also in large parts of southern California, Arizona, New Mexico, and West Texas. Many military and Air Force personnel are stationed in this endemic area and will give a history of having been stationed there at some time in their career. In virtually every proven case of coecidioidomycosis a history of having at least visited in an endemic area can be obtained.

- 2 The coecidioidin skin test, although imperfect, should be routinely used as this will point the finger of suspicion at a majority of cases and at least indicate this condition as a definite diagnostic possibility.

- 3 Serologic studies and complete physical examinations should be done in all suspicious cases. There may be a normal titer found either in the very early acute case or in the old case with chronic residuals. Serial agglutination studies are often important and significant serial changes in titer may be diagnostic in suspected lesions.

- 4 Sputum and/or gastric specimens may often be positive for *Coccidioides immitis* especially in cavitary cases. Fungus cultures and mouse inoculations should therefore be done in all suspected cases.

5 Any cavity lesion which fails to reveal *Mycobacterium tuberculosis* on repeated examinations, should make one suspicious that the disease might be something other than tuberculosis

6 Diagnostic thoracenteses will continue to be necessary in a fair number of cases *C. immitis* spherules should be routinely looked for in all resected granulomatous lesions

### PIEURISY

The diagnosis of tuberculous pleural effusion admittedly is usually inexact. In most cases, no pulmonary infiltration is ever found and no bacteriologic proof is ever obtained. Because of the high relapse rate in untreated tuberculous effusion, and the fact that significant pulmonary disease almost never develops following adequate chemotherapy of a tuberculous effusion, one would much rather treat some patients unnecessarily than overlook any significant cases.

*Primary pleural effusion* of unknown cause in patients who have a positive reaction to tuberculin, either on admission or after several weeks of observation, is presumed to be tuberculous. These patients are given a course of chemotherapy.

Most patients not fitting the above criteria can be eliminated prior to transfer to a tuberculosis center if careful attention is paid to the following: (1) *Primary* meninges without other apparent cause. Acute respiratory infections, especially pneumonia, may produce pleural effusions. Pulmonary emboli, tumors, tracheitis, and virus infections are some of the other conditions which cause pleural effusions. Every effort should be made to establish a definitive diagnosis in all cases, if possible. This should include thoracentesis during the acute phase with careful bacteriologic and cytologic examination of fluid. (2) *Effusion* meninges that the patient has fluid. Occasionally an effusion may develop which is evanescent, showing complete clearing after a few days or a couple of weeks. This is distinctly unusual behavior for an untreated tuberculous effusion and should arouse suspicion as to some other cause. Each year, we see a number of patients in whom there is no effusion but evidence of old pleural thickening with obliteration of a costophrenic sulcus. In most of these patients, old roentgenograms are eventually obtained which show this to be a remote process and an old and unchanging lesion. A little thought and patience in obtaining old films would eliminate most of these cases. (3) If a patient with a pleural effusion is negative to freshly prepared PPD, and if he remains negative after 60 to 90 days on repeat test, tuberculosis can be eliminated as a cause of the effusion.

## GRANULOMA CAUSE UNDETERMINED

Some of these cases represent patients in whom it was believed that tumor was excluded clinically and tuberculin tests excluded on the basis of persistently negative tuberculin tests but in whom both coccidioidin and histoplasmin were positive and therefore, no clinical differential diagnosis could be made. Thoracotomy was not believed to be indicated in some of the patients because of the limited extent of the lesion and the proven stability of the process. In others, thoracotomy was advised for diagnosis but refused by the patient.

In many of these cases, however, surgery was performed and no definitive diagnosis was made. It is interesting to note that in 1952 there was no case in which a final diagnosis of granuloma was made. A relatively high incidence was found in 1953 and in 1955. A lower incidence of this diagnosis was obtained in 1954 and 1956. These wide swings are probably, in part at least, explained on a local situation at this hospital and could be ascribed to personnel changes in the pathology and bacteriology departments and individual differences in willingness to commit oneself to a positive diagnosis if any element of doubt exists.

All granulomas should be diligently examined by tissue sections with appropriate staining as well as by smear and by cultures for both fungi and *Mycobacterium tuberculosis*. In spite of the painstaking investigation, the pathologist is bound to run across an occasional case in which he simply cannot make an etiologic diagnosis. The fact that no such case was found in 1952 seems to be either sheer good luck or an exceptional degree of skill on the part of the pathologist or maybe a little of both. On the other hand the 14 cases so diagnosed in 1955 might signify a run of difficult cases, unwillingness on the part of the pathologist to commit himself if he had the least doubt, or a deficiency in technique.

Probably the 1954 and 1956 figures represent the usual betting average for this diagnosis.

## SARCROIDOSIS

The discharge diagnosis of sarcoidosis is being made with generally increasing frequency in the last three years as compared with the first two years of this study again probably because of an increasing awareness of its existence and the increasing use of surgical biopsy including diagnostic thoracotomy in suspected tuberculous cases and in suspected mediastinal tumor masses.

Sarcoid is often said to be predominantly a disease of the Negro although it is not infrequent in Caucasians. Nodular lung lesions and bilateral hilar adenopathy are the most common thoracic

manifestations. Pulmonary infiltrations tend to be diffuse, linear, and nodular in nature and can be roentgenographically confused with miliary or other extensive forms of pulmonary tuberculosis, tumors, or lymphomas.

Most often the patient is not as clinically ill as his roentgenogram might suggest. The shadows on the roentgenogram are frequently evanescent and can show rapid spontaneous clearing, or increase with no apparent cause.

Great caution should be exercised in making this diagnosis in the presence of a positive tuberculin test, although a negative test is not a prerequisite and many of our patients have shown a positive reaction to tuberculin. In these cases, the diagnosis was made on clinical and roentgenographic grounds, the course of the patient, and most importantly on the basis of repeated biopsies.

It is admittedly possible that the final diagnosis may eventually prove to have been in error and that some of those may actually represent forms of tuberculosis or fungus disease.

Biopsy should be done in all suspected cases, and the diagnosis of sarcoidosis probably should never be made in the absence of positive biopsy findings, because the differential diagnostic possibilities, of both tuberculous and nontuberculous conditions, are usually too serious to permit error.

With the possible exception of the inguinal nodes, any enlarged peripheral node should be removed for biopsy. If there is no peripheral adenopathy, a suprascapular fat pad biopsy should be done as this is a fertile field for finding positive diagnostic tissue. If neither of the preceding gives the answers, a diagnostic thoracotomy with lung or mediastinal node biopsy should be done. The risk of this procedure is small and certainly much less than the risk of overlooking a much more serious disease.

The characteristic pathologic finding is a noncaseating granuloma. If caseation and necrosis are found, considerable doubt is thrown on the validity of a diagnosis of sarcoidosis. Of course, appropriate studies should be done on all biopsy material to rule out possible tuberculous or fungus infection.

Most of the above mentioned studies usually can be carried out at the institution originally seeing the patient, and if awareness of pulmonary sarcoid is high, it should be possible to reduce the incidence of sarcoid cases hospitalized with the diagnosis of tuberculosis or, indeed, called tumor or lymphoma on the basis of an original examination.

#### NEOPLASM OF LUNG PRIMARY

It is noteworthy that the category neoplasm of lung, primary, holds ninth place in the five year total of lesions originally.



considered as tuberculous. Partially, this may be due to the generally younger age group encountered in the military so that, in general incidence in the armed services as a whole is probably less than in the adult civilian populations. To a great extent, however the relatively low place on the list must be due to an increased awareness of the common occurrence of lung tumors on the part of the profession in general. Exploratory thoracotomy is being performed promptly in suspicious cases, especially in lesions in the 40-year and over age groups.

We occasionally encounter tumors however which roentgenographically so closely resemble tuberculosis that a certain error in primary diagnosis will continue to occur. At times, a tumor may erode an old tuberculous focus and produce a misleadingly positive bacteriologic test. Some tumors may cavitate in these instances. Absence of readily demonstrable positive sputum should cause suspicion that the lesion is something other than tuberculous. Uncalcified round foci that are not documented as having been present over a long period of time should all be surgically removed. If a tumor is beyond the limits of bronchosopic visibility and if no ulceration into the bronchial system has occurred bronchoscopy and cytology of bronchial washings will be negative even in highly malignant lesions. Therefore negative bronchoscopy and bronchial washings for tumor cells do not exclude the possibility of tumor although those studies are indicated in all suspicious lesions.

Supraclavicular fat-pad biopsy is useful if extension beyond the lung has occurred. In most cases however exploratory thoracotomy remains necessary to prove or disprove the possibility of neoplasm. A continued high level of suspicion with early exploration in any case where the possibility of tumor is even seriously considered will help to raise the gloomy salvage statistics in cancer of the lung.

In suspicious cases where tuberculosis is also a good differential possibility the patient can be given a short course of intensive antituberculous chemotherapy for a period of from 10 days to 3 weeks prior to thoracotomy.

### BRONCHITIS

Each year a few patients with acute or chronic bronchitis are admitted as possibly having tuberculosis. Persistent coughing, sputum and even hemoptysis might be the reason for suspecting tuberculosis. Frequently a false positive sputum is noted leading to admission. Roentgenographic findings are indefinite and usually no more than increased markings or peribronchial fibrosis is noted. Severe symptoms without definite roentgenographic changes should make one more suspicious of bronchitis or bronchiectasis than of pulmonary tuberculosis. Adequate work

up, including bronchoscopy, bronchography when indicated, and careful and complete evaluation should be done in all cases

### ABSCESS OF LUNG

The few cases of abscess of the lung confused with tuberculosis can be practically eliminated by careful history taking, especially if recent evidence of pneumonitis or aspiration is looked for. Careful physical examination, including observations regarding fever, systemic manifestations, and the type and amount of sputum, must be carried out. The roentgenogram usually shows a cavity lesion, which may be thin or very thick walled. Usually there is less pericavitary infiltration in abscess of the lung than in tuberculosis. Sputum should be cultured routinely and carefully for pathogens as well as for *Mycobacterium tuberculosis* and fungi. A cavity lesion with copious sputum in which acid fast bacilli are not readily demonstrable should cause early suspicion that the patient has something other than tuberculosis, and further study should elicit the proper diagnosis.

### EMPHYSEMA, PULMONARY

Pulmonary emphysema is occasionally confused with tuberculosis, especially localized obstructive emphysema with blebs suspicious of cavitation. The roentgenographic findings are usually somewhat different from those in tuberculosis, although in some patients associated fibrosis may make the differential diagnosis very difficult. Adequate roentgenographic studies, including careful fluoroscopy for evidence of obstructive phenomena, and tomography are useful in differentiating these conditions. Of course, tuberculin testing and careful bacteriologic studies should be done in all cases in which tuberculosis enters into the differential diagnosis.

Pulmonary function studies at times may be quite helpful.

### PULMONARY EMBOLISM WITH INFARCTION

Pulmonary embolism with infarction has been diagnosed with increasing frequency in recent years in patients admitted supposedly as having tuberculosis. This would seem to indicate increasing awareness of this condition by the personnel on the pulmonary disease service at this hospital. Careful attention to the history and careful examination, especially of the legs, for any evidences of thrombophlebitis are important. A history of acute onset with sudden chest pain and cough, with or without hemoptysis, should make one suspicious. Characteristic roentgenographic findings with wedge shaped infiltrations resolving rapidly without definite treatment would point to this diagnosis.

Acute pleural effusion, especially if bloody, which comes on suddenly and clears rapidly is more suggestive of pulmonary embolus than tuberculosis. More critical evaluation of the patient

and more careful follow up for evidences of rapid clearing of suspected lesions should hold this source of misdiagnosis to a bare minimum

### PNEUMOTHORAX SPONTANEOUS

A few cases of spontaneous pneumothorax are seen each year as possible tuberculosis. The older teaching was that tuberculosis was a common cause of this condition, but current information shows that rupture of subpleural emphysematous blebs having nothing to do with tuberculosis is the cause in the great majority of cases. Only a very rare case is the result of tuberculosis. Frequently fluid is apparent after a spontaneous pneumothorax. This may be either bloody or serous depending on how much hemorrhage there has been into the pleural cavity. This is not a primary effusion and if documented as having its onset during or following a spontaneous pneumothorax, the presumption of tuberculosis does not exist even should the patient have a positive tuberculin test.

### HEMOPTYSIS CAUSE UNDETERMINED

"All that spits blood is not tuberculosis." This "wastebasket" diagnosis covers those few cases in which after tuberculosis and other conditions such as tumors, bronchiectasis, bronchitis, heart disease, vascular anomaly, local upper respiratory lesions, pulmonary infarction et cetera, have been excluded, we are left with no good explanation as to why the patient has had a hemoptysis. Most of these cases are legitimately admitted as suspected of having tuberculosis and the final diagnosis represents the culmination of complete painstaking and thorough unrewarding work up. This diagnostic category proves that there are some cases which remain "essential," "idiopathic," "primary," "agnogenic" in plain English. We just have no idea what caused them.

### MISCELLANEOUS CATEGORIES

Having thus disposed of 76.3 per cent of our series, we dismiss another 10.8 per cent with the observation that they comprise 33 separate categories of some individually very interesting cases. But since we must draw the line somewhere, we shall make no mention of them other than listing them in table 3. Another 1.9 per cent can be disposed of by mentioning the 16 cases of "undiagnosed lesion." These patients almost to a man were disposed of by early transfer or were veterans who left against medical advice before adequate diagnostic studies were carried out. The best conclusion was that they were probably nontuberculous; thus they have been included in this series with full realization that we could have included some tuberculosis cases.

## NO PULMONARY DISEASE FOUND

We now come to the final 95 cases. They represent a very disturbing 11 per cent of our patients in whom no tuberculosis was found and who eventually were diagnosed as having no type of pulmonary disease. A few words of explanation regarding the local policy at this hospital are in order to clarify something of what at first appears to be an appallingly large group of cases.

This hospital is not only a large general hospital serving a widespread military and Air Force population and their dependents, but is also a major pulmonary disease, and especially, a major tuberculosis center. A policy has gradually been built up which is somewhat the reverse of that found in almost any other large hospital, military or civilian.

Ordinarily, cases for study and work up without a definitive diagnosis, whether received by transfer or admitted directly from our own outpatient clinics, tend to be admitted to the tuberculosis service if by any stretch of the imagination tuberculosis seriously enters into the differential diagnosis. In most other hospitals, a great number of these patients would probably be admitted to the general medical wards and only transferred to the tuberculosis service if some positive evidence of tuberculosis was found. Thus, undoubtedly, some of the 95 patients in whom no pulmonary disease was found and, indeed, some patients from the previously discussed categories, would originally have landed on the general medical service rather than on the tuberculosis service had they been sent anywhere but to this hospital. Having thus explained away some of our "no pulmonary disease found" as a mirage, we are still left with a substantial number who were needlessly diagnosed as tuberculous and admitted to a tuberculosis hospital. Most of these cases represent avoidable errors. When we consider the severe psychic trauma to the individuals concerned, the interference with a man's career, the unnecessary family inconvenience, the large costs to the Government involved in sending a man half way around the world (in many instances with his family and his furnishings), the unnecessary time lost by a possible essential man on an essential job at an essential time, we can readily see that the error is a costly one, often with far greater implications than a simple mistake in medical judgment.

What then can be done to reduce this source of error? Most of the answers have already been indicated in earlier sections of this article. Thoughtful consideration and attention to detail should be given in all cases. A few specific points are summarized below.

**Tuberculin Testing** This should be done in all suspected cases. As the percentage of tuberculin reactors in our population drops, the tuberculin test is becoming an ever increasingly important pro-

cedure A negative test with freshly prepared intermediate and second strength PPD excludes tuberculosis except in overwhelming infections or early in the course of primary infections The overwhelming infection is usually obvious even without the tuberculin If the tuberculin test does not convert within six to eight weeks after the onset of the disease, the chances are almost 100 per cent that tuberculosis can be excluded

**The False Positive Sputum or Gastric Concentrate** Many of the patients eventually cleared as having no pulmonary disease are admitted because of a single positive laboratory report on sputum or gastric contents with no other evidence to support a diagnosis of tuberculosis Smears of gastric concentrate are a frequent source of error since acid fast saprophytes, morphologically indistinguishable from *Mycobacterium tuberculosis*, are frequently found in smears of stomach aspirates

We believe that smears of gastric concentrates are so frequently misleading that we do not even run them or report them at this hospital Instead, we wait for culture results which, with newer techniques, can be obtained in a relatively short time

Sputum smears are also open to errors of interpretation A trained technician who is thoroughly familiar with the morphologic characteristics of acid fast bacilli is required to correctly interpret the sputum concentrate At times, small scratches in the slide can pick up the acid fast stain, or imperfect staining techniques may result in what are apparently acid fast bacilli but in reality represent foreign material At times though rarely acid fast organisms other than *Mycobacterium tuberculosis* might be found in the sputum A positive smear of either sputum or gastric contents if confirmed by culture, should be suspect

Cultures also may be misleading because certain atypical, acid fast organisms or nonpathogenic contaminants occasionally grow on culture media If the culture is reported as positive in too short a time for the technic used, serious doubt should be entertained that the growth observed actually is *Mycobacterium tuberculosis* The possibility always exists of laboratory errors such as mislabeling of specimens although with painstaking techniques errors can be kept to a minimum In spite of this however, it always is possible in a very busy laboratory that a positive result might be reported when it actually represents a specimen obtained from another patient

A single unexplained positive finding by smear, culture, or guinea pig inoculation that does not fit with the clinical situation is always open to a certain question of accuracy If repeated examinations fail to confirm this single finding, further suspicion arises as to the validity of the single positive report Thus a say that good judgment must be exercised and that under certain

circumstances we are justified in eliminating a positive bacteriologic report on good clinical grounds

**Accurate Interpretation of Roentgenograms** While it is most important that we do not miss significant abnormalities, which unfortunately are too often overlooked, we must also be careful not to grossly overread the roentgenograms. In suspicious cases, repeat roentgenograms with additional views such as apical lordotics, obliques, laterals, and tomography should be obtained to confirm or better delineate a suspected lesion.

**Fluoroscopy** is also very useful in localizing suspected abnormalities. A diligent search should be made in all suspicious cases for old films. In the military, at least a roentgenogram made at the time of induction usually is available. Comparison of serial films often is a vital factor in making a diagnosis.

**Bronchoscopy** In many cases, bronchoscopy is important to prove or disprove endobronchial disease. This is a simple and readily available procedure which can be performed in most military hospitals. At the time of bronchoscopy, bronchial washings for tuberculosis, fungi, and tumor cells can easily be obtained.

**Bronchography** This often is a very important diagnostic tool. In the past, there has been some hesitation in using this modality because Lipiodol (brand of iodized oil) shadows obscured the evolution of serial roentgenographic findings for some time. Today we have good water soluble media which are readily eliminated and will give excellent pictures without interfering with future roentgenographic studies. In indicated cases, therefore, this procedure should be done with no hesitancy.

**Diagnostic Biopsy** Diagnostic biopsy of available nodes, or diagnostic thoracotomy, is necessary at times and should be done wherever needed. If performed by a competent surgeon, the risk is small and frequently is much less than the risk of not doing the biopsy. If tuberculosis is suspected, a short period of intensive antituberculosis therapy prior to biopsy should eliminate the danger of postoperative tuberculous complications.

All the above points are helpful hints that will save unnecessary diagnosis of tuberculosis as well as help in making the correct primary diagnosis, or permit clearance if no disease is found. However, none of the above amount to anything if we forget the basic fundamentals of good clinical medicine, namely, a careful, thorough, and painstaking history and physical examination, critical evaluation of all data, both clinical and laboratory, a high index of suspicion, a searching mind, unsatisfied by a loose or incomplete explanation, good fundamental knowledge of diagnosis and differential diagnosis, and, most important of all, just plain good common sense.

## SUMMARY

Out of a total of 5 324 patients admitted to the tuberculosis service of this hospital with a diagnosis of tuberculosis or possible tuberculosis during the years 1952 through 1956, 851 (16 per cent) were found not to have significant tuberculosis. There has been a heartening decline year by year in this group which speaks well for improved diagnostic and differential diagnostic techniques in chest diseases.

Fifteen nontuberculous conditions accounted for 649 (76.3 per cent) of our cases. These 15 conditions are discussed in some detail. Final clearance with diagnosis of "no pulmonary disease found" was given in 95 (11 per cent) of our cases.

## REFERENCES

- 1 Burke R M and Wier J A Review of cases of nontuberculous disease or sim-  
diagnosed pulmonary tuberculosis. *Am Rev Tuberc* 75:921-937 June 1957
- 2 Burke R M Review of nontuberculous cases originally diagnosed as pulmonary  
tuberculosis. *Minnesota Med* 15:18-22 Jan. 1932.

### AMERICAN COLLEGE OF SURGEONS MEETING TO BE HELD IN ATLANTIC CITY

The 43d Clinical Congress of the American College of Surgeons will be held at Convention Hall in Atlantic City N J from 14 to 18 October 1957. Panel discussions will be a major feature of both the general sessions and sessions concerned with the specialties of Gynecology and Obstetrics. Neurologic Surgery Orthopedic Surgery Plastic Surgery Thoracic Surgery and Urology. Closed circuit operative telecasts film lectures and medical motion pictures will popular items as will be the Forum on Fundamental Surgical Problems. This year eight postgraduate courses also will be given. The detailed program may be seen in current issues of *Surgery Gynecology Obstetrics*.

# STUDY OF 507 PATIENTS DISCHARGED FROM A TUBERCULOSIS SERVICE

A Year's Experience at a Naval Hospital

JOHN A C GRAY, *Captain MC USN*  
GEORGE L. SPENCER *Commander MC USNR*

THE TUBERCULOSIS service at this hospital is maintained for the reception, diagnosis, treatment, and disposition of military patients referred because of known or suspected tuberculosis. More than 500 patients are processed annually. In the belief that they may be of interest to others, data are reported on 507 patients who were discharged between 1 October 1955 and 30 September 1956.

Of the 507 patients, 481 (94.7 per cent) were members of the U. S. Armed Forces on active duty. Twenty-six (5.3 per cent) were supernumerary patients. These included 1 member of a foreign navy, 1 civilian evacuated from overseas, 13 retired members of the U. S. Navy, and 11 dependents of military personnel, including 2 children, who were sent in from overseas or admitted in emergency circumstances.

Of the 481 military patients, 24 (4.9 per cent) were officers and 457 (95.1 per cent) were enlisted personnel, 211 (43.8 per cent) were from the U. S. Navy, 39 (8.2 per cent) from the U. S. Marine Corps, 210 (43.6 per cent) from the U. S. Air Force, and 21 (4.4 per cent) from the U. S. Army. Most of the military patients were Caucasian males in their early twenties (table 1).

## DIAGNOSTIC PROCEDURES

Diagnostic procedures on admission included routine immunologic, bacteriologic, and roentgenographic examinations, conducted in an admitting unit under the supervision of a medical officer and the nursing supervisor.

Immunologic studies consisted of intradermal tests performed regularly by a single experienced hospital corpsman, using tuberculin (0.00002 or 0.0001 mg of purified protein derivative), coccidioidin (1:1,000 or 1:100), and histoplasmin (1:1,000 or



1 100) Patients who failed to react to the smaller doses were retested with the larger Old tuberculin (1 100) was employed in doubtful cases The syringes used for each antigen were kept segregated

TABLE 1 Race sex and age of military patients on active duty

	Number	Percent
Race	409	85.1
Caucasian	65	13.5
Negro	2	0.4
Mongolian	4	0.8
Malayan	1	0.2
American Indian		
Sex	473	98.3
Male	8	1.7
Female		
Age in years	61	12.2
17-19	703	42.2
20-24	96	19.9
25-29	84	17.5
30-39	37	8.2
Over 40		

Inasmuch as the Navy has practiced tuberculin testing of Navy and Marine Corps recruits since 1949 the tuberculin reaction of sailors and marines at the time of their enlistment is shown on their records. This information provided an important diagnostic point of reference.

Sputum specimens when available were examined by smear and culture. Where sputum was not available at least three specimens of gastric contents from the fasting patient were inoculated on culture media. Bacteriologic work was conducted by full time personnel in a laboratory built especially for mycology and tuberculosis bacteriology and equipped with maximum safety features to protect the workers' Roentgenograms of the patients' chests were made and compared with those that usually accompanied them.

Bronchoscopy was abandoned as a routine procedure in 1954 after an analysis of 247 consecutive cases showed that routine bronchoscopy produced positive findings in only 22 (8.5 per cent) of the cases. This small harvest did not appear to justify the anesthetic risk to the patients, the direct exposure of personnel to infectious material or the labor involved. Bronchoscopy was of course performed when indicated.

To reduce the length of hospital stay, loss of treatment time, and patient demoralization, every effort was made in each case to reach a diagnosis within 10 days. The patient was then brought before a treatment conference, told his diagnosis, prospective treatment, and disposition, and invited to ask questions. When it proved impossible to establish a diagnosis within 10 days, the reasons for delay were clearly explained.

All patients except eight were tested with tuberculin. Of the eight, five were transferred at once to the surgical service where the admission diagnosis was established by the pathologist, in the other three, the diagnosis of tuberculosis was already abundantly proved, so that the test was superfluous.

Some of the results of the diagnostic procedures are of particular interest. Five patients with tuberculosis were "bacteriologically positive" but "tuberculin negative." One of these was anergic because of acutely disseminated disease and one, who had primary tuberculosis, was assumed to have delayed reactivity. Technical errors probably were responsible for failure to obtain positive tuberculin reactions in the remaining three cases.

Bacteriologic proof of tuberculosis, either from records accompanying the patients or from our own studies, was obtained in 214 (72.1 per cent) of the 308 military patients with active pulmonary tuberculosis. The chief reason for this small percentage was the large number of patients who had only minimal infection that had been detected by routine roentgenography. The percentage of positive bacteriologic findings was 42.7 per cent in cases classed as "minimal," 82.1 per cent in the "moderately advanced" cases, and 92.6 per cent in the "far advanced." Against this background, it was diagnostically reassuring to find that among the 66 Navy and Marine Corps patients under the age of 25, whose reaction to tuberculin at the time of their enlistment was known, it was possible to demonstrate "Mantoux conversion" in 51 (77.1 per cent). Tuberculin negativity is so characteristic of young Americans<sup>1</sup> that a reaction to tuberculin is significant, and "Mantoux conversion" practically diagnostic.

Of the Navy and Marine Corps patients hospitalized with tuberculosis, 22.9 per cent had had a positive reaction to tuberculin at the time of their enlistment, whereas only 4.6 per cent of recruits in general have a positive reaction.<sup>2</sup> This marked difference suggests that a positive reaction to tuberculin is a liability to a young man or woman.

Among the 39 patients with tuberculous pleurisy, bacteriologic proof was obtained in only 5 (12.8 per cent). Many of these pa-

tients had been tapped and drained prior to admission here and consequently offered no fluid for study. Seventeen of these patients were members of the Navy or Marine Corps, and 16 of the 17 were demonstrated to be recent "Mantoux converters." This is additional evidence supporting the view that a young American with an idiopathic pleural effusion who has a positive reaction to tuberculin had best be treated for tuberculosis.

Testing with histoplasmin and coccidioidin resulted in other noteworthy findings. Among 466 patients tested with histoplasmin 95 (20.3 per cent) reacted whereas of 469 given coccidioidin only 20 (4.3 per cent) reacted. Similar percentages were reported from this hospital in the preceding two years.

### DIAGNOSES

The diagnostic findings in general did not differ greatly from those reported at Fitzsimons Army Hospital in 1953. A diagnosis of tuberculosis in some form was established in 366 (76.1 per cent) of the military patients. The categories are listed in table 2.

TABLE 2 Categories of tuberculosis in 366 of 481 military patients

Category	Number	Per cent
	366	100.0
Total	4	1.1
Pulmonary tuberculosis	3	0.8
Arrested	117	31.9
Primary	134	36.6
Active minimal	54	14.7
Active moderately advanced	39	10.7
Active far advanced		
Tuberculous pleurisy	3	0.8
Tuberculosis extrapulmonary	2	0.6
Of mediastinal lymph nodes	1	0.3
Of superficial lymph nodes	1	0.3
Of kidney	4	1.1
Menigitis	3	0.8
Disseminated from lungs	1	0.3
Miliary		
Unclassified		

More of the cases of active pulmonary tuberculosis among personnel in the naval service were discovered by routine roentgenography (84 or 62.3 per cent) than by investigation of symptoms caused by tuberculosis (54 or 37.7 per cent). The situation was almost the reverse among a comparable number of Air Force personnel. Fifty-seven (40.1 per cent) of these were first de-

ected by roentgenography and 85 (59.9 per cent) because of symptoms. This difference probably arises from the practice in the Navy and Marine Corps of taking annual photofluorograms of personnel.

Twenty one of the military patients were first found to have pulmonary tuberculosis while under treatment for other diseases or injuries. Even this small number emphasizes the value of tuberculosis case finding programs in general hospital populations.

Of the 39 patients with tuberculous pleurisy, 33 presented themselves because of symptoms (nearly always pleuritic pain, fever, cough, and dyspnea of abrupt onset). Three, who claimed to be asymptomatic, were detected by routine roentgenography. In 3 cases, the disease appeared while the patients were under treatment for trauma, acute diarrhea, and anemiasis, respectively.

The nontuberculous entities encountered, most of which are self explanatory, are listed in table 3. These conditions posed the differential diagnostic problems. Percentages are not stated because the whole numbers approximate the percentages.

The most unusual differential diagnostic problem was that presented by a man with a nondescript, bilateral, pulmonary infiltration and dysphagia. Examination revealed cardiospasm with regurgitation of esophageal content into the tracheobronchial tree.

The instances of pleurisy classed as nontuberculous were those occurring in patients who failed to react to tuberculin.

The diagnosis of histoplasmosis is difficult to establish with certainty because it seldom can be proved mycologically. It usually is made either by excluding tuberculosis by means of the tuberculin test or by an evaluation of often incomplete evidence in the case of a patient who reacts to tuberculin as well as to histoplasmin. In all of our 18 cases, the possibility of tuberculosis was eliminated as certainly as possible, by bacteriologic cultures. In two cases, *Histoplasma capsulatum* was identified in "coin lesions" resected from patients, both of whom had been transferred from Panama. Thirteen of the remaining patients were "histoplasmin positive, tuberculin negative," but the other three reacted to both antigens. One of these three, also admitted from Panama, had a pneumonitis that cleared in a few weeks. He has remained well for a year. The other two men, from Tennessee and Kentucky, respectively, displayed pulmonary calcifications only.

Activity was deemed to be present in eight cases because of exudative pulmonary lesions, histoplasmosis complement fixation titer of 1:16 or greater, or report of a granuloma in a liver biopsy, singly or in combination

TABLE 3 *Nontuberculous diseases seen in 115 of 481 military patients*

Nontuberculous disease	Number
Total	115
Histoplasmosis	18
Medical observation	14
Infiltration pulmonary, cause undetermined	13
Calcification pulmonary cause undetermined	9
Granuloma pulmonary cause undetermined	9
Pleurisy chronic nontuberculous	7
Fibrosis pulmonary cause undetermined	7
Pleurisy acute serous cause undetermined	5
Pneumonia primary atypical	4
Bronchitis chronic	4
Sarcoidosis	3
Pneumonia not elsewhere classified	3
Abscess of lung	3
Carcinoma of lung	2
Empyema pleura	2
Bronchiectasis	2
Coccidioidomycosis	1
Bronchitis acute	1
Bronchopneumonia	1
Adhesions of pleura	1
Pneumothorax spontaneous	1
Pneumonia interstitial chronic	1
Atelectasis cause undetermined	1
Peritonitis chronic cause undetermined	1
Achalasia	1
Physical examination	1

Treatment of active cases of histoplasmosis consisted of rest with or without resection of lesions. All patients were ultimately returned to duty.

Throughout the year, an increasingly successful attempt was made to minimize the use of the diagnostic terms "infiltration," "calcification," and "fibrosis, pulmonary, cause undetermined." It is not uncommon for the physician to base his opinion and case-management on probabilities,<sup>6</sup> and careful evaluation of the evidence at hand will usually lead to more definite conclusions in cases so labeled. We retain the term "granuloma, pulmonary, cause undetermined," however, for the postsurgical case in which even the pathologist has been unable to make an etiologic diagnosis. When the ultimate in contemporary technique, namely, histologic and microbiologic examination of excised tissue, has failed, it appears logical to admit the failure and avoid stigmatizing the patient.<sup>7</sup>

### TREATMENT

With the exception of an older, emphysematous man whose "coin lesion" was removed for suspected carcinoma, all patients having active tuberculosis were treated initially with modified bed rest and chemotherapy. Chemotherapy was prescribed for 217 patients according to the Veterans Administration—Armed Forces Protocols for the Chemotherapy of Tuberculosis.<sup>8,9</sup> Such therapy could not be applied to 81 cases already committed to another program prior to arrival, nor to 37 cases because of the timelag between expiration of the 1955 protocols and receipt of their 1956 successors. Protocol therapy was not used in 28 other cases for miscellaneous reasons, including manifestations of tuberculosis not covered by protocols, patient intolerance of drugs prescribed, and administrative oversight.

Three severe hypersensitivity reactions were encountered: 2 to streptomycin and 1 to para-aminosalicylic acid.

Forty-two patients received some form of surgical therapy, other than thoracentesis. There were 34 unilateral subssegmental or segmental resections, 1 bilateral segmental resection, 1 lobectomy, and 1 pneumonectomy. There also were 1 spine fusion for tuberculosis of the vertebrae, 1 decortication, and 1 plastic repair of the chest wall after incision and drainage of a cold abscess. Many of the patients who were transferred to Veterans Administration hospitals were candidates for surgical treatment at a later date.

### DISPOSITION

Nontuberculous patients were either returned to duty or transferred to other departments of the hospital. The single death ascribed to tuberculosis was that of a man whose military meningial disease escaped attention for some weeks before he was admitted to the sick list. Interestingly enough, this man was

brought to medical attention by his friends because of a personality change simulating schizophrenia

The disposition of military patients with pulmonary tuberculosis is shown in table 4. There were no irregular discharges.

TABLE 4 Disposition of 308 military patients with pulmonary tuberculosis

Service	Recommended for duty	Transferred to V A hospitals	Other disposition
Total	42 (13.6%)	259 (84.1%)	7 (2.3%)
U S Navy and Marine Corps	10	139	1
U S Air Force	30	113	5
U S Army	2	7	1

Discharged administratively  
Transferred for humanitarian reasons to other military hospitals to complete treatment

Eight of the 39 patients with tuberculous pleurisy were returned to duty after treatment. 30 were transferred to Veterans Administration hospitals and 1 was transferred for humanitarian reasons to another military hospital to complete treatment. The disposition of patients with extrapulmonary tuberculosis was individualized.

Ten years ago a military tuberculosis service concerned itself primarily with the elimination of the unfit, and 10 years hence improved therapy may have eliminated such a service, but in the meantime it conducts a salvage operation designed to prevent unnecessary waste of restorable manpower. We have not hesitated to recommend return to duty of selected patients with pulmonary tuberculosis, prescribing such limitations as may be indicated in the individual case. The field of posttreatment restrictions in this new era of chemotherapeutically and surgically treated cases is in a state of chaos, often dominated more by opinion and dogma than by facts. In these circumstances, we base our planning on observation of former patients returned for periodic reevaluation, on the findings of Chamberlain and associates,<sup>10</sup> and on five year follow up results of surgical treatment at this hospital as yet unpublished.

Bearing in mind the crowded conditions of life aboard ship, we have been particularly conservative in recommending return to duty of naval and Marine Corps personnel after treatment for pulmonary tuberculosis. The 10 patients so recommended were

all stable individuals over 30 years of age who had received at least one year of effective chemotherapy. Eight of them had undergone successful resectional surgery, and all had been rehabilitated to full activity.

Of the 26 supernumerary patients, 25 proved to have tuberculosis. Treatment was either begun or continued until suitable disposition could be arranged. Three of the retired Navy men died, 2 of arteriosclerotic heart disease intercurrent in active tuberculosis and 1 of carcinoma of the lung and Friedländer bacillus empyema intercurrent in an old inactive tuberculosis.

#### SUMMARY

From October 1955 to September 1956, 507 patients were discharged from the tuberculosis service of this hospital.

Of the 507 patients, 481 (94.7 per cent) were members of the U. S. Armed Forces on active duty. Of these military patients, 366 (76.1 per cent), had some form of tuberculosis. The remaining 115 (25.9 per cent) had other diseases and presented problems in differential diagnosis.

Diagnostic findings, in general, did not differ greatly from those reported at Fitzsimons Army Hospital in 1953.

Active pulmonary tuberculosis was discovered by routine photofluorography in 84 (62.3 per cent) and by investigation of symptoms in 54 (37.7 per cent) of the patients from the Navy and Marine Corps. Among a comparable number of Air Force personnel, 57 (40.1 per cent) patients with active pulmonary tuberculosis were first discovered by roentgenography and 65 (50.1 per cent) by investigation of symptoms.

Twenty-one military patients were discovered to have pulmonary tuberculosis while they were undergoing treatment for other diseases or injuries. This emphasizes the value of tuberculosis case finding programs in general hospitals.

Non-tuberculous conditions that often were difficult to distinguish from tuberculosis were histoplasmosis, and pulmonary infiltration, calcification, or granuloma, of unknown, but non-tuberculous cause.

Ten Navy and Marine Corps patients were recommended for duty after treatment for pulmonary tuberculosis.

#### REFERENCES

1. Gibson, J. Safety in tuberculosis laboratory. *M. Tech. Bull.* 6: 181-184, July-Aug. 1955.
2. Drolet, G. J. and Lovell, A. M. Where to tuberculosis? The first seven years of the antimicrobial era, 1947-1953. *Am. Rev. Tuberc.* 72: 419-452, Oct. 1955.



3. Reier W H and Varney J J Primary serofibrinous pleuritis. In *Transactions of the 48th Annual Meeting of the National Tuberculosis Association*, Boston, Mass. May 26-29 1952 pp 150-156.
4. Spencer G E. and Gray J A. C. Problem of histiocytosis in milary tuberculosis hospital. *Am Rev Tuberc* 75 833-835 May 1957
5. Mayock R L, Burk R M, Pinney C T, Gregory L J and Vier J A. New trends in treatment of tuberculosis. *U S Armed Forces J* 6: 35-50 Jan. 1955.
6. Starr L. Significance of facts guest editorial (Editorials and Comment section) *J A M A* 160: 672-673, Feb 5 1956.
7. Weed, L. A. Microbiologic methods in surgical pathology *Proc Staff Meet. Mayo Clin* 29: 393-399 July 14 1954
8. Appendix C, ptocols for the chemotherapy of tuberculosis as revised following the 14th Veterans Administration-Army-Navy Conference in Atlanta, Ga. Feb. 10, 1955 11th revision Mar 15 1955 In *Transactions of the 14th Conference on the Chemotherapy of Tuberculosis* Atlanta, Ga. Feb 7-10 1955 by the Veterans Administration-Army-Navy with the cooperation of the National Tuberculosis Association p 527-545
9. Appendix C, protocols for the chemotherapy of tuberculosis 15th Veterans Administration-Army-Navy Conference in St Louis Mo Feb 6-9 1956. 12th revision Mo. 1956. In *Transactions of the 15th Conference on the Chemotherapy of Tuberculosis*, St Louis Mo Feb 6-9 1956, by the Veterans Administration, Army-Navy with the cooperation of the National Tuberculosis Association pp 589-606.
10. Chamberlain, J M, Storey C, F, Klostrock, R. and Daniels C. F. Segmental resection for pulmonary tuberculosis (300 cases). *J Thoracic Surg* 26: 471-485 No 1953

---

Death is something that even doctors shy away from discussing with patients facing it. To allow and even draw them out about it is most demanding and stirs up considerable anxiety within the therapist. In fact there is a great temptation to escape a discussion of death by diverting the patient from this topic or offering meaningless platitudes. Much fear can be banished and much courage and tranquility can be achieved if the doctor can be a little less afraid than the patient."

—*Psychiatric Bulletin* p 66  
 Summer 1955 (Vol 5 No 3)

# INCREASING DENTAL SPEEDS

FRANK J BRAUER *Commander DC USA*

**G.** V BLACK<sup>1</sup> once stated that, "The professional man has no right to be other than a continuous student," and rapid advances in dental operative instruments during the past few years have made this statement especially applicable to our present period. The range of speed available to the profession has increased to such an extent that we have far surpassed what Walsh and Symmons<sup>2</sup> advocated in 1949, however, there still is little agreement as to what is the optimum speed of rotation. The answer will have to be derived by the slow process of correlating clinical and laboratory data. We cannot make snap decisions in either laboratory or clinic, but must patiently weigh and evaluate our results, and from the mass of accumulated information evolve what is best for the profession.

Over past decades, the various specialties of dentistry advanced to a remarkable degree, but not until 1940 to 1946, in conjunction with advances being made in precision instruments, machine tool manufacture, and diamond and carbide burs, did operative dentistry begin to come into its own. Whereas in the past we all have experienced difficulty in penetrating the occlusal enamel, penetration now can be accomplished in a matter of seconds. New concepts in operative techniques<sup>3</sup> have shortened operative time to such a marked degree that chair time may be reduced by 50 to 60 per cent, depending on the type of restoration.<sup>4, 5</sup>

## METHODS OF INCREASING SPEEDS

The types of power being used or investigated at present are (1) air, (2) water, and (3) motor. Although none of these are new in concept, the various applications are interesting and time alone will tell their relative value.

**Air Turbine Handpiece.** Air has been studied as a possible power source by several investigators in various parts of the world. Tanner and Mitchell<sup>6</sup> reported that speeds of 55,000 r p m and higher were attained with an instrument running free. A small

---

From U S Naval Dental School, National Naval Medical Center, Bethesda Md.  
Comdr Brauer is now at Naval Station, Navy No 127 c/o Postmaster, Seattle Wash.

turbine is located in the head of the handpiece resulting in a compact balanced instrument

Stephens described two experimental models with speeds in the 25 000 to 35 000 r p m range Large turbines are located on the spindle end of these instruments, and rotor speed of 50 000 to 70 000 r p m were obtained When used with the Imperator handpiece speeds were about 35 000 r p m Acrylic was used in the housing and rotor in an effort to study the functioning of these experimental models

The air driven handpiece described by Peyton<sup>1</sup> has a speed of about 75 000 r p m when cutting and higher speeds when running free The turbine is located on the spindle end of this handpiece

At the present time there is an indication that several handpieces utilizing the air turbine principle will soon be available commercially and will attain speeds in the 200 000 to 300 000 r p m range

**Water Turbine Handpiece** There are several experimental models of water turbine handpieces and one type is now commercially available A water turbine (hydraulic) handpiece developed at the University of Michigan operates at about 60 000 r p m The rotor or drive turbine of this instrument is located on the spindle end

The hydraulic handpiece developed by Nelson Pelander and Kumpula is in the 61 000 r p m range It has a small drive turbine in the head of the contra angle

Both air turbine and water turbine instruments are free of the usual engine arm and belt sources of vibration Because of a minimum number of moving parts they also are relatively free of heating These instruments have low torque values and can be stopped readily by heavy loads or pressures applied to the cutting tool so that stones large sized diamonds and disks are relatively ineffective The air turbine handpiece offers slightly higher torque values making it effective with burs This may be due to the slightly greater mass of its impeller or turbine The low torque relation of many of these new instruments actually is of value for those who have a tendency to bear down or use too much pressure in cutting procedures

A hard water source may create a slight problem with the water turbine instrument A major problem with the air turbine handpiece in the past has been the high noise level created by the escaping air but newer models have insulation in and around the turbine head to eliminate some of the noise

**Motor Driven Handpiece** A dental handpiece with a small electric motor attached to the spindle end of the instrument was developed at the University of Michigan for the United States Army.<sup>4</sup> The latest model was built by the Hannu Engineering Company, Inc. This instrument operates from a 12-volt-battery source and develops 15,000 r p m with a straight handpiece and 9,500 r p m with contra angle. The contra angle attaches to the straight handpiece by a sleeve union. It would be interesting to see what the increase in r p m would be with one of the newer contra angles that increase the r p m 2½ times in the contra angle head. The average handpiece weighs 5½ to 6 ounces. This instrument weighs 6½ ounces and is well balanced. The stalling torque is 2.8 ounces.

This instrument offers many possible uses in the sick room, hospital, remote areas, et cetera. The Army Research and Development Division is now field testing it for military applications. Indications are that a handpiece of this type will be made available commercially in the near future. It will contain a belt ratio drive from the motor to the contra angle head and will develop speeds well into the 100,000 + r p m range.

**Motor of Unit** In a survey of 50 units being used by practitioners, Kilpatrick<sup>10</sup> found a maximum range of 6,000 r p m, with an average of about 3,500 r p m. Most manufacturers now provide a multiple speed unit with a more powerful engine and a selection of speed ranges. In the old type unit having normal speeds of 4,000 to 6,000 r p m, opening the shunt resistance of the motor circuit will produce approximately the following speeds for units of the makes indicated: (1) S. S. White Dental Manufacturing Co., 8,500 to 9,000 r p m, (2) Ritter Co., 10,000 to 13,000 r p m, (3) Weber Dental Manufacturing Co., 16,000 r p m.

According to the manufacturers, motors will tolerate the increased speeds without excessive wear, provided they have plastic insulation between the poles of the commutator instead of the old type mica insulation. The resistors are porcelain tubes about 4 inches long, light green or white in color, lying in a horizontal or vertical position within the dental unit. A toggle switch placed in the wiring circuit will give increased speeds when the resistors are cut out. This change does not affect the automatic breaking of the series wound motor.

**Engine Pulley** An increase in the diameter of the engine pulley by a ratio of 2:1 over the diameter of the handpiece pulley will increase the operating speed by about the same amount.<sup>7</sup> The average present-day engine pulley is 1 to 1½ inches in diameter. By increasing the size of the pulley to 2½ or 3½ inches, speeds up to 20,000 r p m can be attained.

Delta and the tension plays an important part in  
increased slack, which also adds a safety  
factor as much as 2,000 r p m. By  
lengthening the rotating handpiece, proper adjust-  
ment of the belt can be made. Kilpatrick<sup>11</sup> suggested the  
use of a belt to lessen slippage tendencies.

Various bolts have been investigated and tested in an attempt  
to prolong the life of most bolts may be lengthened  
by washing the bolts once or twice a month and allowing  
the belt to dry out before using.

Friction is the main foe to increasing handpiece  
speed. In the idler pulleys on the belt armature and  
replacing the ball bearing idler pulleys friction will be  
reduced to a range of 6,000 to 10,000 r p m can be ob-  
tained. This helps to eliminate some of the drag on the  
dentist.

**Handpiece Improvements for Higher Speeds.** Manufacturers have ap-  
proached the problem of improving handpieces for use with higher  
speeds in different ways. Some of their improvements are: modi-  
fied sleeve bearing metal bearing surfaces that are self-aligning  
on the shaft; use of ball and socket principle; stainless steel ball  
bearings; improved chucks; improved bur insert and latch (made of  
hardened steel or carbide); closer tolerances; longer shafts;  
phosphor bronze sapphire needle or glass bearings; rat belt  
drive (no gears); automatic oil mist (no oiling); self-contained  
water spray; and self-contained air cooling.

This is not a complete list but it indicates the types of im-  
provements that have been made in handpieces to go with higher  
speeds.

## VIBRATION STUDIES

Vibration is a nuisance factor that causes tension and apprehension in the patient. In 1948 and 1949 Walsh and Symmons<sup>12</sup> published their far-reaching reports on vibration perception. Their basic work was a milestone for the dental profession. All their tests were performed with an oscillometer on the upper central incisors of patients. They found that the upper threshold of sensation was from 500 to 600 cycles per second (c p s) with a mean of 560 c p s. Maximum unpleasantness occurred from 100 to 200 c p s with a mean of 178.2 c p s. The range of vibration caused by the dental handpiece was found to be from 95 to 115 c p s with a mean of 111 c p s which falls within the maximum unpleasantness range. As a result of their studies Walsh and Symmons also concluded that the harder the material being cut the higher the harmonics.

Henry and Peyton,<sup>14</sup> in their vibration studies of rotating dental instruments, came to the conclusion that when operating with light pressures there is a tendency for the amplitude of vibration to decrease as the speed is increased, with the larger burs showing a greater vibration characteristic.

Sources of possible unpleasant vibrations include poor adjustment (contra angle and handpiece), worn clutch, latch, bur seat (internal play), or bearings, frayed belt belt vibration, and eccentric bur vibration. In short, any movable part of the system can contribute to vibration. To overcome some of the handpiece vibration, several manufacturers have changed to longer shafts, and instead of gear drive have used a belt drive or the turbine principle.

Hudson and associates<sup>15</sup> showed by high speed photography that an eccentric rotating dental instrument in an increased speed range of 6,000 to 10,000 r.p.m. can cause vibration of 100 to 200 c.p.s., which is in the unpleasant range for the patient, and that true running burs produce a ratio well above 600 c.p.s. when rotated at the same speeds.

#### TEMPERATURE STUDIES

Hensel and Mann<sup>16</sup> showed normal body temperature caused of patients. This seems to which he showed the pain tolerance zone patients to be from 85° to 130°F.

**Bur Temperature** In studies of dental cutting instrument the temperature of the head of thermocouple wire was soldered and connected to a Brown which recorded the temperature of dentin with the tooth held in normal cavity preparation, at 2,000 r.p.m. and of 27 temperatures as high as 35° penetrated the occlusal enamel with a No. 8 round bur and temperature of or over 600°F.

In changing to a bakelite properties to dentin, the following temperature developed in a force of 200 grams (about was approximately 150°F slope of the bur blade under

at a variance of 10°C from the pain at the dentoenamel junction or with Hensel's studies,<sup>17</sup> in which zone patients to be from

temperature developed in rotating burs were measured by using a constantan thermocouple of a test bur connected to a potentiometer, data recorded on bur. In cutting the bur under pressure as in denture were recorded of 150°F at 2,000 r.p.m. In some cases, when cutting in attempting to cut a tooth at 500 r.p.m. of a round tooth - 7500 r.p.m. of a tungsten carbide bur, a record was

also obtained in practical work. Results were obtained (1) The difference between the bur blades with the same speed of a round bur, (2) The temperature of the cutting

(3) The temperature of the bur blade and base to be constant

to be highest for the slope of the curve tends to 24 000 r p m

### Tooth Temperature

used speeds of 30 000 r p m with 1/2 to 1 lb maximum temperature conclusions after 10 seconds after

temperature rise was less than steel bur. Carbide bur produced less rise in temperature than steel bur that turned faster produced less

in 1951 to 1955, Poyton and Vaughn<sup>11-12</sup> used speeds up to 11 000 r p m. The maximum temperature is reached in 10 seconds after 10 r size burs produced a lower temperature rise than steel burs. Carbide burs produced less rise in temperature than steel burs with the findings of Lammie<sup>13</sup> that carbide burs cut faster, lasted longer and produced less mass of enamel cut than steel burs.

In 1951, Poyton and Vaughn<sup>11</sup> tested inverted cone type bur. The diamond point bur used the inverted cone point. Using No 37 burs with 1 lb pressure and with no coolant the steel bur produced a temperature rise of 70°F at 10 000 r p m which was 20°F at 1 lb pressure and 25 000 r p m, the carbide bur 50°F at 1 lb pressure and 10 000 r p m and 170°F at 1 lb pressure and 25 000 r p m and the diamond point, 40°F at 1 lb pressure and 10 000 r p m and 150°F at 1 lb pressure and 10 000 r p m.

A temperature rise of about 15°F was noted with the water spray coolant. When 1 lb pressure was used the water was effective in keeping the temperature rise in the tooth to less than 20°F. With no coolant, the No 37 carbide bur showed a temperature rise of slightly less than the steel bur and the rise was almost the same for carbide as for steel burs when using coolants. The diamond instruments showed less temperature rise than was shown by the burs under all comparable conditions of study. The carbide bur generally caused a little less temperature rise in the tooth than the steel bur. It is interesting to note that these studies measured temperatures generated in the tooth structure and not in the cutting instrument as in Hudson's studies.

To measure the temperature of the structure being cut Vaughn and Peyton<sup>1</sup> inserted a small thermocouple into the tooth at the dentoenamel junction then cut away the tooth tissue until the thermocouple was exposed.

Isanti and Zander<sup>14</sup> stated that the tooth is capable of dissipating heat rather efficiently less elevation being noted in

the thicker layers of dentin, but concluded that physiologic changes occur in the dental pulp at temperatures above 130°F

**Coolants** A coolant is needed for any increase in handpiece speeds, and water spray is the most effective under practical conditions, with only a 15°F rise in temperature noted at 30,000 r p m. A water stream could keep this temperature rise to 1° to 2°, but this would require 50 ml/min. The saliva ejector is not adequate for handling this amount of liquid and thus additional equipment would be required. At a flow of 18 ml/min, there is a 40°F rise of temperature. Air is not as effective, especially on diamonds, and the temperature rapidly rises with increasing r p m. Disks in general are not as easily cooled as burs, but perforated disks are more easily cooled than solid ones.

According to Doerr,<sup>14</sup> the advantages of using a coolant are that it eliminates heat and protects the pulp, tends to keep the cavity clean, prevents clogging of instruments, acts as a lubricant, cushions vibration to a certain extent, increases life of burs and diamonds, and makes it easy to remove old restorations. He lists as disadvantages the need for hose attachments, interference with vision, and splattering of mirror (a detergent used on the mirror will help to lessen this effect).

#### EFFICIENCY OF CUTTING INSTRUMENTS

From the tests conducted on the efficiency of cutting instruments, Hudson and Associates<sup>15</sup> concluded that when cutting dentin, steel and carbide burs have equal cutting rates at either 5,000 or 10,000 r p m. When cutting enamel at 5,000 r p m, steel and carbide bur cutting rates are substantially the same (the life of the steel bur is much shorter), but at 10,000 r p m carbides cut twice as fast as steel. At either 5,000 or 10,000 r p m, diamonds are more effective than either type bur.

Poyton<sup>16</sup> conducted tests with speeds up to 18,000 r p m on Iverine and concluded that (1) the rate of increase in efficiency is maintained rather consistently for the higher operating speeds, (2) it is not to be expected that all burs will show an equally effective increase in efficiency with an increase in operating speed, (3) the spiral type bur is more effective than the straight fissure bur at all operating speeds up to 18,000 r p m, because the straight fissure bur had more of a tendency to become clogged, (4) the amount of material removed is dependent upon the pressure applied, and (5) the No. 37 inverted cone bur showed one third as much active area as the No. 557 straight groove fissure bur, but will remove five times the amount of material per unit time as the fissure bur. On the basis of unit active area, a ratio of approximately 15:1 exists in favor of the inverted cone bur.



**Higher Speeds of Rotation** Ingraham and Adelson<sup>25</sup> using ivory in their studies of cutting efficiency of the No 558 carbide bur and speeds up to 40 000 r p m, concluded that cutting efficiency increased with increase in speed and that doubling the pressure applied approximately doubled the rate of removal. More laboratory studies are needed at the higher speeds of rotation up to and including the 200 000 r p m range. Out indications are that steel burs are ineffective carbide burs maintain their efficiency at the higher ranges of speed carborundum stones increase in efficiency at the higher ranges and diamond instruments maintain their efficiency although this seems to be dependent upon peripheral speed.

The term r p m means little at present and the more important consideration is the rim (peripheral) speed of the instruments. According to engineering and machine principles, diamonds are supposed to be more or most effective in the 5,000 to 9 000 feet per minute range.<sup>26</sup> The 1/8 inch diameter diamond instrument at 30 000 r p m has an approximate rim speed of 1 000 feet per minute. To achieve a rim speed of 5 000 feet per minute, the r p m would have to be about 150 000. The 1 inch diameter diamond instrument rotating at 20,000 r p m will achieve peripherally some 5 000 feet per minute.

**Design and Shape of Burs and Diamond Instruments** The best shape for cutting burs is not definitely known and many different investigators as well as the manufacturers have been working on this problem for a long time.

**Manufacture of steel burs** The bur itself is dependent upon the steel used.<sup>27</sup> Automatic screw machines are used for blanking then burs are milled or head cut to produce the flutes or teeth. Some machines cut the side and end flutes in one continuous operation while other machines only perform one operation, thereby necessitating a second cutting step. After processing the burs are hardened by a salt bath and polished.

**Carbide burs** Tungsten carbide burs are manufactured<sup>28</sup> by first making the steel shaft and brazing soldering or welding the tungsten carbide to this shaft. The bur head or flutes are cut with diamond instruments. A sintered head carbide bur is available in which the tungsten is held together by almost pure cobalt. These burs can withstand temperatures up to 800 F. The steel shafts are prone to rust if left in a strong oxidizing agent or in various types of chemical sterilizing agents. Carbides are more efficient at high speeds.<sup>29</sup> Reversing direction or side pressure may fracture blades. The bur should be rotating before being brought into contact with surface being cut and better

control is assured by moving the bur in a clockwise direction around the cavity walls.

Henry<sup>10</sup> has reported on the problem of bur design in relation to true cutting and to clogging tendencies as affected by end flutes and changes in bur diameter, cutting length, and number of flutes. As the number of blades is decreased, the magnitude of forces at each blade increases and the thickness of chip removed by each flute should increase correspondingly. A smaller number of flutes increases the space between flutes and decreases the clogging tendency. In removing more material, each flute shows more tendency for flute wear and cutting life is decreased. Small or number of flute are more vibratory. Henry concluded that (1) only the last one thousandth of an inch of flute edge is effective for cutting soft material, and this distance decreases as the hardness of the material increases until in some cases only a few micro inches of blade edge are effective, (2) the finish does not have much effect, and (3) heat treatment has a slight effect but burs without it cut equally well.

In a previous study of changes in the rake angle, Henry and Peyton<sup>11</sup> concluded that (1) a more negative rake angle cuts less but resists dulling more, and (2) the cutting efficiency of the bur is correlated with the angle and the percentage clearance space (at speeds up to 12,000 r p m using Ivorine).

The bur manufacturers have production and labor costs to contend with in trying to produce a relatively inexpensive bur, and the small increase in efficiency does not necessarily warrant the added cost. Undoubtedly with the increase of speeds of rotation, design and efficiency experimentation might result in closer tolerances and standardization of the dental bur in the future.

*Diamond instruments* The small diamonds are retained on the base by electroplating them into the metal matrix (electrolytic amalgamation). The diamond is held in place by mechanical retention. Peripheral speeds from 5,000 to 9,000 foot per minute are required for efficient operation.<sup>12</sup> Using the largest wheel possible to perform the cut will extend the life of the instrument. Diamond functions best on hard structures. Light pressures should be used. Better control of the instrument is had by using a dragging motion and not attempting to push it into the structure being cut. Coolant water spray helps minimize clogging and heat production. A clogged diamond is an inefficient and ineffective cutting instrument.

To clean diamond instruments, several methods may be used. Liquid and cream type cleaners containing oxygenating chemicals should be used with a stiff brush. Rubber abrasive, or ink eraser

should be used at high speed and light pressure. Hard stick abrasive resembles light baked ceramic and should be soaked in water or run under water when being used. To remove amalgam, heat the instrument lightly over a gas flame or soak in mercury overnight.

### CONCLUSIONS

The use of increased dental speed has both advantages and disadvantages. Some of the advantages are that less pressure is required and less fatigue is produced; the operator has more control; the patient feels less vibration; the efficiency of burs and diamonds is increased, and chair time is decreased.

Disadvantages consist of the special practice and trained tactile sense required at high speed; the necessity of using coolants which tend to obscure the field of operation; the need for more exacting care and maintenance of equipment; or for purchasing new and expensive equipment; the unpleasant noise level; the greater wear on ball bearings, clutch and bur seat; the greater possibility of pulp damage; and the necessity for efficient aspiration.

### SUMMARY

Dental handpiece speeds have increased rapidly in the past 10 years and speeds in the 200 000 to 300 000 r.p.m. range are not uncommon. Innovations introduced to produce high speeds include the water turbine, the air turbine, and increased ratios of gears, belts, and pulleys. Friction is the main obstacle and various manufacturers have introduced improvements in handpieces to overcome it.

The vibration produced by rotating dental instruments has long been annoying and distressing to the patient. The frequency of vibration produced at low speeds is in the most unpleasant range, while true running burs and diamonds operated at high speeds produce vibration well above the unpleasant frequency range. Many factors play a part in producing unpleasant vibration and manufacturers of dental instruments and handpieces have used various approaches to meet this problem.

Increased temperatures are produced by increase in either handpiece pressure or rotational speed. To dissipate the heat produced by increased speed, a coolant must be employed, water spray being the most effective.

The efficiency of carbide burs and diamond instruments increases with increase in speed, specifically rim (peripheral) speed.

Increased speed offers certain advantages, but involves some disadvantages. Extensive laboratory and clinical studies will be required to determine optimum speeds of rotation, effective efficiency ranges of carbide burs and diamond instruments, and many other problems associated with high speeds.

## REFERENCES

- 1 Black G V Limitations in dental education *Dental Rev* 21 703 718 July 1907
- 2 Walsh J P and Symmons H F Comparison of heat production and mechanical efficiency of diamond instruments stones and burs at 3 000 and 60 000 R P M *New Zealand D J* 45 28 32 Jan 1949
- 3 Ingraham R and Tanner H M Adaptation of modern instruments and increased speeds to restorative procedures *J Am Dent A* 47 311 323 Sept 1953
- 4 Wolcott R B General considerations of increased rotary speeds for cavity preparation *J Georgia D A* 26 15 19 Apr 1953
- 5 Tanner H M Greater efficiency through modern instruments and higher speeds *Am Dent* 15 34 37 June 1956
- 6 Tanner P H and Mitchell R C Air driven dental hand piece Presented to Dental Materials Group at 32d general meeting of International Association for Dental Research March 21 22 1954 abstract *J Dent Res* 33 700-701 Oct 1954
- 7 Stephens R R Air turbine handpiece motors *Brit Dent J* 100 345 351 June 19 1956
- 8 Peyton F A Evaluation of dental handpieces for high speed operations *J Am Dent A* 50 383 391 Apr 1955
- 9 Nelson R J Pelander C E and Kumpula J W Hydraulic turbine contra angle handpiece *J Am Dent A* 47 324 329 Sept 1953
- 10 Kilpatrick H C High speed in amalgam cavity preparation *Dental Digest* 61 258 265 June 1955
- 11 Kilpatrick H C Modern concepts of high speed *New York Dent J* 26 71 72 Feb 1956
- 12 Walsh J P and Symmons H F Vibration perception in teeth during cavity preparation *New Zealand D J* 44 39-41 Jan 1948
- 13 Walsh J P and Symmons H F Vibration perception and frequencies *New Zealand D J* 45 106-114 Apr 1949
- 14 Henry E E and Peyton F A Vibration characteristics of rotating dental instrument *J Dent Res* 29 601 615 Oct 1950
- 15 Hudson O C Hartley J L Moore R and Sweeney W T Factors influencing cutting characteristics of rotating dental instruments *J Am Dent A* 50 377 382 Apr 1955
- 16 Hensel H and Mann G Pain in human teeth caused by temperature variations and heat conduction *Stoma* 9 76-85 Apr June 1956
- 17 Hensel C J Pain control by cold control *Dental Digest* 47 444 446 Oct 1941
- 18 Hudson O C and Sweeney W T Temperatures developed in rotating dental cutting instruments *J Am Dent A* 48 127 133 Feb 1954
- 19 Vaughn R C and Peyton F A Influence of rotational speed on temperature rise during cavity preparation *J Dent Res* 30 737 744 Oct 1951
- 20 Peyton F A Temperature rise and cutting efficiency of rotating instruments *New York State Dent J* 18 439 450 Nov 1952
- 21 Peyton F A Temperature rise in teeth developed by rotating instruments *J Am Dent A* 50 629 632 June 1955
- 22 Lammie G A Comparison of cutting efficiency and heat production of tungsten carbide and steel burs *Brit Dent J* 90 251 259 May 15 1951
- 23 Lisanti V F and Zander H A Thermal injury to normal dog teeth in vivo measurements of pulp temperature increases and their effect on the pulp tissues *J Dent Res* 31 548 558 Aug 1952

- 24 Doerflinger E L et al Increase in adsorption for rotating instruments *J Prosthet Dent* 1953; 10: 188, Oct 1955
- 25 Adelson F L *Practical Composite*
- 26 Collins C M Increase in bacterial resistance in restorative dentistry *J Prosthet Dent* 1953; 10: 34, Mar 1955
- 27 Smith R H Manufacture of steel denture bars Read in Material Group session of 31st General Meeting of IADR, 1st Association for Dental Research March 10-2 1953 *Abstract J Dent Res* 32: 99 Oct 1953
- 28 Linn G A et al Smith R H Effect of sterilizing agents on tungsten carbide *Brit Dent J* 94: 171, 17 Apr 1953
- 29 Linn G A et al Smith R H Fundamental study of tungsten carbide dental dies *Unpublished manuscript*
- 30 Henry E E et al Factors on the performance of the indirect *J Dent Res* 35: 641 Oct 1956
- 31 Henry E E et al Relationship between design and cutting of *J Dent Res* 33: 292 Apr 1954

### C REACTIVE PROTEIN TEST IN MYOCARDIAL INFARCTION

1 It is not a specific test for myocardial infarction however it seems to be an excellent adjunct in both the diagnosis and the prognosis of myocardial infarction

2 It is more reliable than the sedimentation rate in following the natural evolution of myocardial infarction

3 It is highly positive in patients with acute myocardial infarction and qualitative changes in C reactive protein follow clinical and electrocardiographic improvement

4 It is negative in healed infarctions coronary insufficiency and coronary failure syndrome

5 It is negative in the premonitory phase of myocardial infarction

6 The persistence of a positive C reactive protein test is usually indicative of progressive infarction phlebotrombosis or some other embolic phenomenon "

—ERNEST L LEVINGER M D  
in *Annals of Internal Medicine*  
p 84 Jan 1957

# REDUNDANCY OF THE SIGMOID COLON

PETER ZANCA *Colonel MC USA*

**B**ORDERLINE anatomic variations and anomalies of the esophagus and gastrointestinal tract that cause few symptoms attract little attention and seldom are the subject of an interesting scientific report. Redundancy of the colon is one of these borderline conditions which is only casually mentioned and usually is not given serious consideration either in differential diagnosis or for the symptoms it produces. The tendency to disregard this anatomic variant is common. Actually, redundancy of the colon occurs in from 15 to 25 per cent of the general population and in about 60 per cent of all patients who suffer with chronic constipation. It should be strongly considered and differentiated from aganglionic congenital megacolon.

The purpose of this article is to emphasize the high rate of occurrence of redundancy of the colon in infants and children, and especially of the sigmoid flexure of the colon, and to re-emphasize the point that this condition should be seriously entertained and ruled out before a working diagnosis of congenital aganglionic megacolon is made. Definite diagnosis of Hirschsprung's disease is made only after surgery and on histologic study of the bowel specimen.

Since Swenson, Neuhauser, and Pickett<sup>1</sup> brought our attention to the anatomic abnormality responsible for congenital megacolon, we have become aware of all of the signs and symptoms that lead to this diagnosis. The emphasis on this condition is so great that both pediatricians and radiologists sometimes are inclined to establish the diagnosis of Hirschsprung's disease on minimal or doubtful radiological findings. The difficulty mainly involves proper interpretation of the rectosigmoid area and areas of dilatation of the colon.

Roentgenographically, the diagnosis of Hirschsprung's disease is made when there is a constant narrowing of the rectosigmoid area for a variable distance, with dilatation of the colon proximal to the constricted area. In most cases, there is some loss in the haustral markings of the colon and some decrease in the peristaltic activity of the dilated portion of the large bowel.

- 24 Doerr R E Use of increased speeds for rotating instruments *J Ach St D A* 37 181 188, Sept 1955
- 25 Adelson, F L Personal communication
- 26 Chayes C M Increased efficiency speeds in restorative dentistry *J Prost D* 5 232-234 Mar 1955
- 27 Strider K H Manufacture of steel dental burs Read in Materials Group s ses of 31st General Meeting of International Association for Dental Research March 20-22 1953 abstract *J Dent Res* 32 709 Oct 1953
- 28 Lammi G A and Sanford E J Effect of sterilizing agents on tungsten carbide burs *Brit Dent J* 94 171 177 Apr 7 1953
- 29 Ingraham R and Tanner H M Fundamental rules for use of tungsten carbide and diamond instruments Unpublished manuscript
- 30 Henry E E Influence of design factors on the performance of the inverted cone bur *J Dent Res* 34 04713 Oct 1956
- 31 Henry E E and Peyton, F A Relationship between design and cutting efficiency of dental burs *J Dent Res* 33 281 292 Apr 1954

#### C-REACTIVE PROTEIN TEST IN MYOCARDIAL INFARCTION

\*1 It is not a specific test for myocardial infarction however it seems to be an excellent adjunct in both the diagnosis and the prognosis of myocardial infarction

\*2 It is more reliable than the sedimentation rate in following the natural evolution of myocardial infarction

\*3 It is highly positive in patients with acute myocardial infarction and qualitative changes in C reactive protein follow clinical and electrocardiographic improvement

\*4 It is negative in healed infarctions coronary insufficiency and coronary failure syndrome

\*5 It is negative in the premonitory phase of myocardial infarction

\*6 The persistence of a positive C reactive protein test is usually indicative of progressive infarction phlebotrombosis or some other embolic phenomenon "

—ERNEST L LEVINGER M D  
in *Annals of Internal Medicine*  
p 84 Jan 1957

# REDUNDANCY OF THE SIGMOID COLON

PETER ZANCA *Colonel MC USA*

**B**ORDERLINE anatomic variations and anomalies of the esophagus and gastrointestinal tract that cause few symptoms attract little attention and seldom are the subject of an interesting scientific report. Redundancy of the colon is one of those borderline conditions which is only casually mentioned and usually is not given serious consideration either in differential diagnosis or for the symptoms it produces. The tendency to disregard this anatomic variant is common. Actually, redundancy of the colon occurs in from 15 to 25 per cent of the general population and in about 60 per cent of all patients who suffer with chronic constipation. It should be strongly considered and differentiated from aganglionic congenital megacolon.

The purpose of this article is to emphasize the high rate of occurrence of redundancy of the colon in infants and children, and especially of the sigmoid flexure of the colon, and to re-emphasize the point that this condition should be seriously entertained and ruled out before a working diagnosis of congenital aganglionic megacolon is made. Definite diagnosis of Hirschsprung's disease is made only after surgery and on histologic study of the bowel specimen.

Since Swenson, Neuhauser, and Pickett<sup>1</sup> brought our attention to the anatomic abnormality responsible for congenital megacolon, we have become aware of all of the signs and symptoms that lead to this diagnosis. The emphasis on this condition is so great that both pediatricians and radiologists sometimes are inclined to establish the diagnosis of Hirschsprung's disease on minimal or doubtful radiological findings. The difficulty mainly involves proper interpretation of the rectosigmoid area and areas of dilatation of the colon.

Roentgenographically, the diagnosis of Hirschsprung's disease is made when there is a constant narrowing of the rectosigmoid area for a variable distance, with dilatation of the colon proximal to the constricted area. In most cases, there is some loss in the haustral markings of the colon and some decrease in the peristaltic activity of the dilated portion of the large bowel. There also

From U S Army Hospital, Fort Dix, N J.



is a loss in the normal peristaltic activity of the narrowed segment of the colon in the rectosigmoid area and the rectum itself appears normal in caliber and in function. The roentgen manifestations of Hirschsprung's disease have been well demonstrated in the literature. I should like only to re-emphasize the need for oblique and lateral views of the rectosigmoid area because the narrowed segment of the colon is best seen in this way.

With a patient having a history of chronic constipation, abdominal distention, difficulty in defecation and passage of small hard stools, the physician will order a barium enema examination with the aim of establishing or ruling out intrinsic organic disease or functional disease of the large bowel. When these symptoms are present in children and in infants, the possibility of congenital megacolon is immediately entertained. Under such circumstances the barium enema examination is done and the roentgenographic findings frequently are equivocal.

Redundancy of the colon is a condition in which the colon is unduly long or dilated. It may form extra bowel loops and may lie in various positions within the abdominal cavity. Kantor<sup>2</sup> described three common varieties of redundant colon: (1) the centrally placed sigmoidal loop that rises out of the pelvis, (2) "double splenic flexure with straight efferent loop" and (3) "pelvic loop to the right." Redundancy of the sigmoid colon, as used in this article, refers to the long intrapelvic portion of the large intestine which rises high above the pelvic brim in the abdomen to a level above the intercrural line of the bony pelvis. This segment of the colon may lie in the midline or extend to the right or left abdominal regions.

The diagnosis of redundancy of the colon is easily made when a large part of the colon is involved; however, the problem of diagnosis remains when we are dealing only with redundancy of the sigmoid colon. Accurate diagnosis of this condition in children is especially important when the possibility of congenital aganglionic megacolon is considered.

In the usual normal colon the sigmoid flexure of the large bowel lies well within the pelvis on the roentgenogram of the barium-filled colon (fig. 1). The diagnosis of redundancy of the sigmoid colon can be made from the roentgenogram when the superior margin of the sigmoidal loop extends well above the intercrural line of the bony pelvis after the colon is distended by either air or fluid (barium) as shown in figure 2. In this type of colon the rectosigmoid area appears normal and there is normal peristalsis throughout the large bowel. With the large bowel emptied the sigmoid flexure of the colon is seen to descend into the pelvis (fig. 3).



*Figure 1 Normal colon distended with barium. Note position of various segments of the large bowel in relation to the bony pelvis.*

The roentgenographic finding of the sigmoidal loop above the level of the pelvic inlet, with absence of a narrowed segment of the colon and with normal peristaltic function, is sufficient to differentiate this condition from congenital megacolon. The final diagnosis of redundancy of the sigmoid colon is made, however, after the following conditions are ruled out: (1) organic disease distal to rectosigmoid area, (2) functional disease distal to the rectosigmoid junction, (3) intrapelvic pathology, (4) mechanical disorders that are the result of some previous surgical procedure, (5) excessive weight loss, and (6) atonic colon following administration of drugs.

There are numerous variations of the colon which are found in individuals of different habitus. These may be due to con-



Figure 2 Redundancy of the sigmoid colon. Note high position of sigmoid flexure above intercrystal line of pelvis.

genital malformation of the bowel or secondary to malformation of adjacent tissues. In the colon, anomalies in length, malrotation or incomplete rotation of the gut, and anomalies of fixation of the bowel account for most of the variations. The sigmoidal redundancy may result from a congenitally malformed long or large segment of the bowel, functionally disturbed segments or hypermobility of the sigmoidal loop because of a large mesentery. Normally the sigmoid colon is held in place by the pelvic mesocolon. This mesentery may be large or redundant and so allow for mobility of the sigmoidal loop of the colon. In the average sized individual, the sigmoid flexure of the bowel will move only a limited distance when filled with fluid or gas. Usually it will not extend above the intercrystal line of the bony pelvis. Fixation of this segment of the bowel should arouse suspicion of intra abdominal or intrapelvic disease.

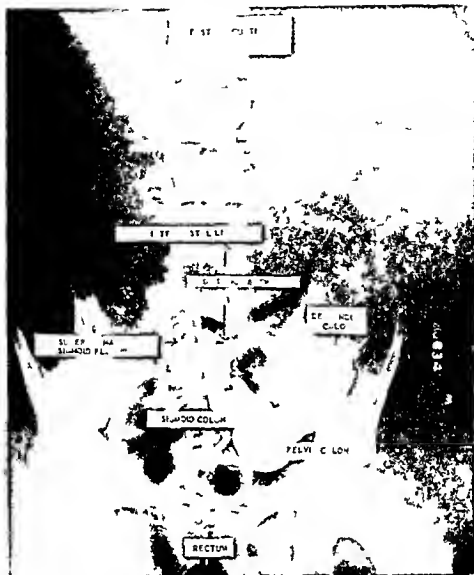


Figure 3 Postevacuation roentgenogram demonstrating empty colon with descent of sigmoid colon into its normal intrapelvic position.

Redundancy of the colon is a frequent cause of chronic constipation and should be ruled out in all patients having this symptom. Many textbooks mention that colonic redundancies constitute variations of normal and that they usually are of no pathologic significance. In some books, emphasis is made of the possible occurrence of fecal stasis in redundant segments of the large bowel, others emphasize the frequency of occurrence of volvulus and obstruction as a result of redundancy.

In 1934, Kantor<sup>3</sup> recorded an 18.5 per cent incidence of dolichocolon in 1,850 patients. In his series of patients, 66 per cent had had constipation from birth, 21 per cent complained of abdominal distention, and 55 per cent had abdominal pain. In reviewing 100 consecutive office case records of patients with some type of colonic dysfunction, Bockus and Willard<sup>4</sup> found

redundancy of the colon in 29 per cent. In 1949 Zeisel<sup>5</sup> reported four infants and children with chronic constipation and with redundancy of the sigmoid colon. Feldman<sup>6</sup> reported that the sigmoid colon is involved in over 50 per cent of all of the cases of dolichocolon. Portis<sup>7</sup> stated that the sigmoid colon lies in the pelvis in 90 per cent of adults, in 10 per cent it rises upward toward the umbilicus, a position usual in infants. This information was obtained from studies on cadavers. In roentgenographic studies of the living adult colon, Portis found the sigmoid colon above the pelvic brim in more than 10 per cent of the cases.

In 1956 we performed 200 barium enema examinations, many to rule out organic disease. Our patients included 14 infants and children and 186 adults, with an age range of from 3 weeks to 72 years. Some patients gave a history of chronic constipation, abdominal pain, and gaseous distention. Most of our patients had a variety of symptoms that included diarrhea, rectal bleeding, intestinal obstruction, ulcer, hemorrhoids, and possible intra-abdominal masses. Only 16 (9 per cent) of the entire group gave a history of chronic constipation. 182 (91 per cent) had other abdominal complaints and symptoms. Of the 16 patients with chronic constipation there were 12 (66.6 per cent) who had a redundancy of the sigmoid colon, in the other 4 the sigmoid colon was within normal limits. Of 182 patients having symptoms other than chronic constipation, there were 19 (10.4 per cent) with sigmoid redundancy. The over-all rate of occurrence of redundancy of the sigmoid flexure of the colon was 15.5 per cent (31 cases). Of special interest was the finding that 14 of the 31 cases (45 per cent) were infants or children. All of the infants and children in this random sample had redundancy of the sigmoidal flexure of the colon, of this group, 7 (50 per cent) had been studied mainly because of chronic constipation. Of the 186 adults 17 (9.1 per cent) had redundancy. We had 1 surgically and histologically proven case of aganglionic megacolon.

Kantor<sup>8</sup> emphasized the possible clinical syndrome of constipation, gaseous distention, and abdominal pain in patients with dolichocolon. We believe that more emphasis should be placed on this entity and that an attempt should be made to separate those cases from the true aganglionic megacolon, which is amenable to surgery. Faced with an infant or child with a history of chronic constipation, a barium enema examination should be performed and the following causes of constipation should be considered: (1) organic lesions of the bowel or adjacent tissues that cause mechanical obstruction; (2) functional conditions (those caused by improper diet, drugs, psychogenic disorders, poor bowel habits and sedentary life, and hypotonic or hypertonic intestinal tract); (3) diseases of peripheral nervous system; (4)

allergies, (5) trauma, (6) infection, (7) endocrinologic disorders, and (8) redundancy of the colon

The diagnosis of redundancy of the sigmoid colon can be made in the adult after study and evaluation of the history, physical findings, and roentgenographic picture. In the infant and child, diagnosis of this condition is sometimes difficult because the colon has not assumed its full grown, final, and fixed anatomic position in the abdomen.

In infants, multiple variations in position and caliber of the colon are common, as part of normal development and growth. The reader is referred to the excellent tracings in Caffey's *Pediatric X Ray Diagnosis* that demonstrate variations of the position of the colon in infants. These variations of development should be considered when studying the colon of infants and children, and in the absence of positive symptoms or history they should be considered as normal variants. With symptoms of chronic constipation, obstruction, distention, and pain, and in the presence of normally formed bulky stools, the possible diagnosis of redundancy of the colon should be entertained.

Management of the redundant colon is directed toward establishing good health habits with proper diet, avoiding drastic laxatives and enemas, and establishing regular time schedules for eating and defecation. Recently, beneficial effects and good results have been obtained by treatment with senna (*Cassia acutifolia*). Some cases of redundancy of the sigmoid colon have been successfully treated by segmental resection.

#### CONCLUSIONS AND SUMMARY

Redundancy of the colon is an anatomic, physiologic variant that is found in the newborn infant but persists into adult life in only a small per cent of individuals. Redundancy of the sigmoid flexure is the most common form, and is sometimes mistaken for aganglionic congenital megacolon.

From a study of 200 barium enema roentgenograms chosen at random, it may be concluded that the over all rate of occurrence of redundancy of the sigmoid colon is about 15 per cent. It is frequently found in children and infants, and is present in about 1 out of 10 adults. The incidence in adults who give a history of chronic constipation or have some other abdominal complaint is relatively low (9.1 per cent, or 17 of 186 cases in this series). The incidence of redundancy in infants and children who give a history of chronic constipation or of some other abdominal complaint is high (100 per cent, or 14 of 14 patients in our series).

The low rate of redundancy in the adult and the very high rate of redundancy of the sigmoidal flexure in children and infants

suggests that the redundant infantile colon might in some cases, revert to the normal anatomic and physiologic colon of the adult

Patients with redundancy of the colon are inclined to develop constipation and chronic constipation frequently is accompanied by or causes sigmoidal redundancy (in 12 of 16 cases 66.6 per cent in this series)

Accuracy of diagnosis of redundancy of the colon is essential in symptomatic patients for proper medical management

#### REFERENCES

- 1 Swenson O A, Uhlschlag E B D and Peckitt L K A review of etiology diagnosis and treatment of congenital megacolon (Hirschsprung's disease) *Pediatrics* 4: 201-209 Aug 1949
- 2 Kantor J L Common malrotation of the duodenum and colon: a statistical analysis of 83 cases (combined clinical and roentgen study) *J. A. M. A.* 97: 1785-1790 Dec 12 1931
- 3 Kantor J L A malrotation of the colon: the roentgen diagnosis and clinical significance: a review of 10 year study *Radiology* 23: 651-66 Dec 1934
- 4 Boeckx H L and Willard J H Functional disorders of the colon. *Pennsylvania M. J.* 37: 645-652 May 1934 Cited Boeckx H L *Gastro-Enterology* Vol II The Small and Large Intestine and Peritoneum. W B Saunders Co Philadelphia Pa 1947 p 395
- 5 Zerkow H Dolicho-Sigmoides und Kodescher Aenderungen *Praxis* 1: 23-235 Jul-Aug 1949
- 6 Friedman M *Clinical Roentgenology of the Digestive Tract* 3d edition Williams & Wilkin C B Itomre Md. 1948 p 501
- 7 Portis S A *Diseases of the Digestive System* 3d edition Lea & Febiger Philadelphia Pa 1953 p 52
- 8 Caffey J *Pediatric X-Ray Diagnosis* 3d edition The Year Book Publishers Inc Chicago Ill 1956 p 546

# THE SIGMOID SEGMENT AS A BLADDER SUBSTITUTE

JOHN W. SIMPSON *Colonel MC USA*  
WARNER F. BOWERS *Colonel MC USA*  
CLAUDE C. DODSON *Colonel MC USA*

**E** VISCERATION of the pelvic organs, whether it be for tumors of the internal genitalia, bladder, or colon, may require excision of the bladder, making it necessary to provide some method of dealing with urinary drainage. Essentially, there are three possibilities: (1) cutaneous ureterostomy, (2) wet colostomy, or (3) bowel segment substitute.<sup>1</sup> In each method there are definite hazards and complications, as well as favorable points for consideration. Probably there is a place for each of these procedures.

## CUTANEOUS URETEROSTOMY

Formerly, when more definitive procedures carried a prohibitively high mortality rate, bilateral cutaneous ureterostomy was an acceptable procedure. Now, however, it rarely is necessary to resort to this less satisfactory operation. Two urinary cutaneous fistulas plus a colostomy seem to be more than the patient should be asked to bear. Furthermore, the stomata are difficult to keep dry and repeated catheterization usually leads to infection. Cutaneous ureterostomy is indicated in severely ill patients who will not tolerate more extensive surgery, in cases where there is marked hydronephrosis and hydro ureter from tumor compression, and where there is marked reduction in kidney function either from pressure of obstruction or from urinary tract infection. In these instances cutaneous ureterostomy may be lifesaving, and a more acceptable procedure may be substituted later if the tumor is controlled and if kidney function improves sufficiently.

## WET COLOSTOMY

If kidney function is good and hydro ureter and infection are not prominent, implantation of the ureters into the intestinal tract is advisable. The simplest of these procedures is uretero-



sigmoid implantation, forming a wet colostomy. Cited as a disadvantage is the psychic trauma from absence of micturition, but surely this is not serious. The serious complications are (1) ascending infection which often is fatal, (2) ureteral obstruction at the site of anastomosis, (3) decreased kidney function incident to one of the preceding, (4) fistula formation, and (5) a large surface for reabsorption of urine. Inasmuch as it is relatively simple to form a separate loop into which the ureters can be implanted, obviating most of the difficulties enumerated above, there seems little excuse for continuing to use the wet colostomy by choice.

### BOWEL SEGMENT SUBSTITUTE

**Electrolyte Imbalance.** Much has been said regarding the development of electrolyte imbalance and various abnormal chemical changes due to the reabsorption of urine following uretero-intestinal anastomosis. Both large bowel and small bowel segments have had their respective proponents. It might be supposed theoretically that a large-bowel segment would absorb more because this is its normal function, but some observers have declared that there is greater absorption from an ileal segment. Lapides<sup>1</sup> on the other hand, has shown that hyperchloremia and acidosis are dependent upon the degree of kidney function rather than the degree of bowel absorption. Normal individuals given urino-onemias did not develop electrolyte imbalance because the kidneys could accommodate the greater load imposed by reabsorption, whereas patients with kidney disease did develop electrolyte imbalance after urino-onemias. This explains why some patients with uretero-intestinal implants develop electrolyte imbalance early, some late and some not at all. Patients with normal kidney function excrete the reabsorbed electrolytes and do not develop imbalance. Patients with poor kidney function due to ureteral obstruction, infection or both, develop electrolyte imbalance early. If the implantation causes improvement in the kidney function, the imbalance tends toward normal again. Patients who develop imbalance late do so because kidney function gradually deteriorates due to stenosis or infection. This concept seems to indicate that whether large or small bowel segments are used is less important than other considerations.

**Preparation of the Bowel Segment.** Two usual misconceptions must be dispelled before proceeding further with this discussion. First, there is no thought of creating a cystic retaining receptacle such as the bladder.<sup>2</sup> The isolated bowel segment is used entirely as a means of avoiding cutaneous ureterostomy and wet colostomy with their attendant complications. The bowel seg-

ment need not be large, as it never need accommodate several hundred milliliters of urine. In fact, such accumulation is undesirable. Second, there is no sphincter control of the bowel segment and no periodic emptying. Consequently, it makes little difference in which direction the peristaltic activity functions in the segment, so that reversal of the segment to slow up drainage has no advantage and may simply twist the mesentery, jeopardizing blood supply.

Ordinarily it is safe to generalize that the simplest procedure which will accomplish the desired result is the best. Therefore, it seems unnecessary to use the cecum and terminal ileum as bladder and venting tract, as advocated by Bricker and Eiseman.<sup>4</sup> This is a procedure of much greater magnitude than the circumstances usually warrant. Use of an ileal segment entails division of small bowel in two places, end to end anastomosis, closure of one end of the isolated segment, implantation of the ureters, and exteriorization of the free end of the segment. Since the rectum is being removed as part of the original operation and the large bowel must be divided anyway to form the permanent colostomy, it is simpler to avoid all of these procedures on the small bowel. We advocate use of a sigmoid segment in the following manner. The sigmoid colon is divided at a level consistent with safety from the standpoint of the tumor. The distal end then is brought to the skin surface and the sigmoid is measured for length so that it extends without tension somewhat to the right of the sacral promontory. This marks the site for division of the colon to form the distal isolated loop. The proximal point of division now becomes the colostomy stoma, the proximal end of the isolated segment is closed by inversion, and the distal end becomes the urinary stoma (fig. 1). Care must be taken to see that blood supply is not compromised, that the isolated segment is not under tension, and that it will allow implantation of the right ureter readily. The ureter must not be stripped from its bed for any appreciable distance because this interferes with its blood supply and peristaltic function. Also, the ureter must not stretch like a violin string across the peritoneal cavity to serve as a point for bowel obstruction. Finally, a clamp is left on the colostomy for from 48 to 72 hours, but the urinary stoma can be left open, with a soft catheter for sump drainage. If desired, primary application of a rubber ileostomy device is feasible and acceptable.

**Technic of Bowel Ureter Anastomosis.** Ureterosigmoid anastomosis has given poor results in the past because of obstruction and ascending infection. Many operative procedures have been devised to overcome these defects and essentially, most of them have attempted to promote obliquity of anastomosis between the ureter and bowel. It should be noted that naturally one structure

traverses the wall of another in an oblique fashion This prevents reflux and reduces the area of weakness in the wall In almost every instance where operative procedures do away with this obliquity, difficulty from reflux ascending infection or herniation result This has been the story in ureter bladder implantation in common bile duct-bowel anastomosis, and even in inguinal hernia repair Appreciation of this concept led to

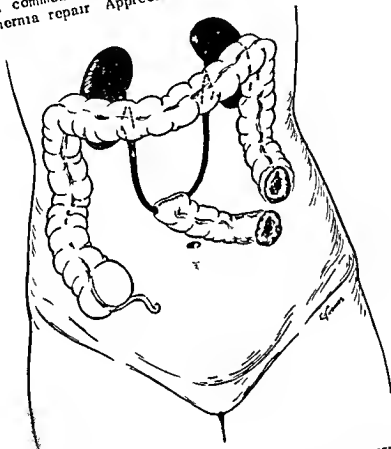


Figure 1 Diagram showing anatomic relation of ureters sigmoid segment used as bladder substitute and urinary and colostomy stomata

the procedure of forming a tunnel in the sigmoid wall proximal to the point of ureteral implantation but this often led to stenosis and obstruction If the ureters are to be implanted into an isolated bowel segment without fecal stream such reflux is not a factor and obliquity therefore is not necessary in this instance Another point of difficulty has been stenosis at the stoma from failure to use mucosa to mucosa anastomosis Cordonnier<sup>1</sup> has emphasized this and his technic is advocated This consists of several interrupted fine stitches of full wall of ureter and

mucosa of sigmoid. A second layer is made by suturing serosa of sigmoid to adventitia of ureter to make a snug but not tight closure. This anastomosis must be watertight but not constricting. Such a mucosa to mucosa closure promotes accurate healing and decreases stricture formation. Finally, it should be emphasized again that one must bring bowel to ureter rather than ureter to bowel.

**Location of Stoma.** As in ileostomy for ulcerative colitis or colostomy for carcinoma, it is important to locate the stoma in such a way that bony prominences are avoided and that the bag appliances can be worn as inconspicuously as possible. This means that the lower abdominal quadrants between umbilicus and iliac crest are preferred. If a colostomy and a small bowel bladder substitute are used, symmetrical points on right and left are acceptable. However, if a sigmoid isolated segment is preferred, the urinary stoma must emerge on the left side. It seems best to make the colostomy on the left and then to place the urinary stoma sufficiently below it to allow room for the ring of the bag. This does not make too much bulk even though both stomata are in the left lower quadrant.

**Mechanics of Emptying.** Since the bowel segment is to serve as a channel for discharge of urine rather than as a retaining cavity, it is essential to see that drainage is not impeded. Necessarily, gravity is the most important factor, and with the patient upright, a not too redundant segment drains naturally. Too long a segment allows collection of urine which by its weight may obstruct the loop. It may be necessary to attach the middle of the segment to the abdominal wall but this poses a problem in obviating the loop itself as an axis about which loops of small bowel may twist. Probably, care in getting the segment of proper length is the best safeguard. Peristalsis is another factor in promoting drainage and again, since collection is not the desired end, it is not advisable to reverse the loop to slow drainage.

We recently have had occasion to do a celiotomy upon one patient, two years after exenteration. We found the ureters slightly dilated, but otherwise normal in appearance. The sigmoid segment had the appearance of normal bowel.

#### SUMMARY AND CONCLUSIONS

The possible methods of management of the ureters, assuming excision of bladder and rectum to be necessary, are cutaneous ureterostomy, wet colostomy, and bowel segment substitute. Bilateral cutaneous ureterostomy may be indicated in the seriously ill and in patients with hydro-ureter, urinary tract infection, and impaired kidney function, but is a poor                      fo                      itive

choice The wet colostomy favors serious ascending infection and obstruction of the ureter with added danger of infection and decreased kidney function and offers a much greater surface for urinary reabsorption There seems to be little occasion for its use Use of an isolated sigmoid segment is simple and obviates most of the serious complications inherent in the other methods Our personal experience embraces the various methods described, and although it has been too small to be of statistical value we prefer the isolated sigmoid segment

#### REFERENCES

- 1 Teicher I Karlitz L M Shaft n G W Complications of wet colostomy after pelvic evisceration corrected by separation of urinary and fecal streams report of case *Ann Surg* 137 129-134 Jan 1953
- 2 Lap des J Mechanism of electrolyte imbalance following ureterosigmoid transplantation *Surg Gynec & Obst* 93 691-704 Dec 1951
- 3 Kling F W and Bricker E M Evacuation of urine by ileal segments: man *Ann Surg* 137 36-40 Jan 1953
- 4 Bricker E M and Eisen B Bladder reconstruction from cecum and ascending colon following resection of pelvic viscera *Ann Surg* 132 77-84 July 1950
- 5 Cardoni J J Ureterosigmoid anastomosis *Surg Gynec & Obst* 88 441-446 Apr 1949

---

Females outnumbered males for the first time in the Census of 1950 but by only 1 per cent This margin it is estimated will grow to 3 percent by 1975 This trend will reflect the rapid rise in the excess of females over males at the ages 45 and over At ages 45-64 females will exceed males by more than 10 per cent in 1975 at ages 65 and over the excess will be about 40 percent

—Statistical Bulletin

Metropolitan Life Insurance Company

p 6 Mar 1955

# CARCINOMA OF THE ESOPHAGUS

## Survival, and the Fallacy of "Early Diagnosis"

EDDY D PALMER *Lieutenant Colonel MC USA*

THE discouraging results of treatment of esophageal carcinoma are largely due to the inherent nature of the tumor, and as yet little can be done to change that. This is merely a statement of the concept of "biologic predeterminism," as emphasized by Macdonald and Kotin<sup>1</sup> in connection with the limited curability of gastric carcinoma. Almost all of those who write and advise on the subject not only emphasize the importance of early diagnosis above all else but offer it as the solution for currently unsatisfactory surgical results. It would be ideal, they say, if the first subjective hint of trouble would drive the patient to the doctor and if the doctor would then immediately suspect cancer, look for it, and find it.

During a perusal of personally observed cases of carcinoma of the esophagus, it was found that in 16 the tumor either had been discovered prior to development of symptoms or had first caused symptoms while the patient was under active medical surveillance for some unrelated disease. The present report describes experiences with these ideally "early" cases.

### DETECTION

The basic information on the 16 cases is given in table 1. In spite of the briefness of the courses, detection and identification of the esophageal disease posed no problem. There was no diagnostic delay due to smallness of the lesions. Four patients were asymptomatic as far as the esophagus and carcinoma were concerned, their tumors having been unexpectedly discovered during roentgenologic (2 patients) or esophagoscopy (2 patients) examination, carried out for study of cirrhosis, pernicious anemia, or cardiomegaly. Among the patients who developed clinical manifestations before the tumor was found, the interval between the physician's cognizance of the first manifestation and detection of the tumor amounted to no more than nine days. Nine patients were under hospital care at the time the first manifestation of esophageal cancer appeared; three were being followed closely as outpatients. In two

favors serious ascending infection  
 with added danger of infection and  
 and offers a much greater surface  
 it seems to be little occasion for  
 sigmoid segment is simple and ob-  
 complications inherent in the other  
 experience embraces the various methods  
 has been too small to be of statistical  
 isolated sigmoid segment

# REFERENCES

1. L. A. Sh. G. W. Complications of wet c lost my alt r  
 noted by section of urinary d f cal streams r port of  
 1 19 134 J 1953
2. I cr a f lectrolyt amb l ce f flow s uretero igm id tra  
 v m c J Obst 93 691 704 D c 1951
3. V d Brick r E M E cuate n of ur by ile l segme ts i m  
 3 40 J 1953
4. B x r M d E s m B Bladder contraction from cecum ad sc di g  
 i l wing r ctio of p l v e v i cer Ann. Surg 132 77 84 July 1950
5. C r r r J J Uter e sigmoid st mosis Surg Gynec & Obst 88 441 446  
 A r 19 9

Females outnumbered males for the first time in the Census  
 of 1950 but by only 1 per cent This margin it is estimated  
 will grow to 3 percent by 1975 This trend will reflect the  
 rapid rise in the excess of females over males at the ages  
 45 and over At ages 45 64 females will exceed males by  
 more than 10 per cent in 1975 at ages 65 and over the ex-  
 cess will be about 40 percent

—Statistical Bulletin  
 Metropolitan Life Insurance Company  
 p 6 Mar 1955

# CARCINOMA OF THE ESOPHAGUS

## Survival and the Folly of "Early Diagnosis"

EDWIN D. MILLER, M.D., F.R.C.P., F.R.S., F.R.C.S., F.R.C.R.

THE CARCINOMA OF THE ESOPHAGUS is a disease of the esophagus, a tube which carries food from the mouth to the stomach. It is a disease of the lining of the esophagus, and as it grows it can spread to other parts of the body. There are two main types of this cancer, one of which is called squamous cell carcinoma and the other is called adenocarcinoma. Squamous cell carcinoma is the most common type, and it is usually found in the middle and lower parts of the esophagus. Adenocarcinoma is the second most common type, and it is usually found in the upper part of the esophagus. Both types of cancer can spread to other parts of the body, and this is why it is so important to detect it as early as possible. However, the fact is that the only way to detect it is by having a test called an endoscopy, which is a procedure in which a doctor uses a special instrument to look inside the esophagus. This test is not always successful, and even if it is, it is not always possible to remove the cancer. Therefore, the only way to survive is to have the cancer removed as early as possible, and this is why it is so important to detect it as early as possible.

During a review of personally reviewed cases of carcinoma of the esophagus I was forced to conclude that the only way to detect it as early as possible is by having a test called an endoscopy, which is a procedure in which a doctor uses a special instrument to look inside the esophagus. This test is not always successful, and even if it is, it is not always possible to remove the cancer. Therefore, the only way to survive is to have the cancer removed as early as possible, and this is why it is so important to detect it as early as possible.

### DETECTION

The basic information on the 7 cases is given in Table I. In spite of the hopelessness of the disease, a search for a cure was made. The results of the search are given in Table II. There was no agreed delay in the diagnosis of the disease. Four patients were asymptomatic as far as the esophagus and carcinoma were concerned, the tumors having been unexpectedly discovered during routine gastroscopy (2 patients) or esophagoscopy (2 patients) examination carried out for a variety of reasons: pernicious anemia or cardiac disease. Among the 3 patients who developed clinical manifestations before the tumor was found, the interval between the physician's recognition of the first manifestation and detection of the tumor averaged 10 months, the longest being 18 months. Nine patients were under hospital care at the time the first manifestation of esophageal cancer appeared and they were being followed closely as outpatients. In two





Figure 2 On the first examination seven days after the first complaint of dysphagia this high degree of tumorous narrowing of the distal esophagus was found (patient 15)

#### TREATMENT

Seven patients including 3 of the 4 whose carcinoma was discovered by chance during the asymptomatic period, were considered inoperable at the time the lesion was detected. Resection was found possible in only 5 of the 9 who were

performed upon Three of the resected tumors involved the distal one third of the organ, and 2, the middle one third

Seven patients were given deep radiation therapy, as shown in the table. Personal dilatations were freely used, as indicated, but no other treatment was given. Gastrostomy eventually became necessary in one patient, in spite of dilatations

### SURVIVAL

As can be seen from the table, the courses in general were short, and the cause of death in all but patients 11 and 16 was the esophageal carcinoma. Two patients died shortly after resection. Only 4 survived a year following detection of the tumor, and only 2 were alive at the end of the second year. All but patient 9 were studied at necropsy, and it was found that at the time of death there were no gross distant metastases in 8 patients.

### COMMENT

This little series theoretically offered no favorable esophageal carcinoma material as one can hope to manage, using the currently available diagnostic approach. It is true that the co-existing disease influenced the operability rate to a certain extent, although this rate (56 per cent) was quite comparable to that observed in many large reported series.<sup>2</sup> It would not be particularly fruitful to compare the survival in this "early" group with that of the more usual type of esophageal carcinoma case. Poor results are poor results, and no encouragement for the esophageal carcinoma matter can be found in the present experience.

As long as surgical extirpation must be relied upon for hope of cure, a diagnostic approach which depends for its initiation on recognition by the patient that something is wrong is entirely inadequate. No one can doubt that early diagnosis is better than delayed diagnosis, but it is clear that by the time the first symptoms of esophageal carcinoma appear the great majority of patients are beyond surgical cure. Kiviranta<sup>3</sup> is one of the very few authors who have been realistic on this point. After studying the records of 3,756 patients who died of esophageal carcinoma in Finland, he concluded, "The life expectancy in patients subjected to treatment had no relationship whatever to the length of the symptomatic period prior to therapy. This is probably due to the fact that the tumor is as a rule diagnosed only after having reached a certain size inducing dysphagia, and the life expectancy of such patients is generally equally long, nor is radiotherapy able to affect it." This is an especially significant statement, not only because Kiviranta is an important authority but also because it shows that, when put to the test with a large number of routine cases, the concept of salvage through "early diagnosis" is meaningless.

It is not being suggested that surgical resection be abandoned as treatment, however impotent it proves for cure, because it furnishes two important palliative benefits. First, whether or not the removal of a primary tumor ever slows the growth of metastases in the case of esophageal carcinoma a remarkably large proportion of patients die from the local effects of the primary tumor itself regardless of metastases, and many die with no gross evidence of metastasis at all. Second, the most distressing subjective feature of the disease and one which in the absence of prophylactic effort is almost inevitable with long survival is esophageal occlusion. Resection of high living carcinomas is too hazardous to justify it for any purpose other than intended cure but limited distal resections when followed by peroral dilatations often prove of inestimable usefulness through preclusion of obstruction.

But it is important not to confuse little advancements with solutions. There is nothing about the present and rather unimaginative therapeutic approach to esophageal cancer to warrant more than mild interest until a better line of attack is found. Therapeutic sights must be set much higher than they are at the moment. Finding technologic means for extirpating portions of the esophagus and reestablishing continuity has clearly not solved the problem of esophageal carcinoma as far as cure is concerned. The danger is that continued effort, money, and, especially, thinking may be expended in exploring the same dead end path rather than on the obviously more productive possibilities of serodiagnosis and chemotherapy.

#### SUMMARY AND CONCLUSION

Esophageal carcinoma was detected in 16 patients either before it had produced symptoms or immediately afterward. A brief review of the therapeutic results in these patients discloses the inadequacy of "early diagnosis," as the term is now used as an answer for the discouraging problem of esophageal carcinoma. Surgical extirpation can increase the patient's comfort and perhaps his period of survival, but it proves wholly inadequate as realistic therapy. It must be concluded that to be successful long before the lesion has made its presence clinically apparent or it must be of such a nature that it will destroy cancer tissue everywhere throughout the body all at once.

#### REFERENCES

1. Macdonald I (Los Angeles) and Kott P. Biologic pit d r main sm in g struc carcinoma as limiting factor f curability Surg Gynec & Obst 98: 149-152 Feb 1954
2. Humphreys G H II and Moore R L. Carcinoma involving esophagus 5 Clin North America 33: 389-400 Apr 1953
3. Kiviranta V K. Carcinom of esophagus it inc deac \*g and s x distrib on and prognos 3 in Finland Acta oto-laryng 42: 73-88, 1952

# RUPTURE OF PREVIOUS CESAREAN SECTION SCAR IN SUBSEQUENT PREGNANCIES

## Report of Seven Cases

JOHN R KANE, Lieutenant MC USA

WILLIAM S HAFER Jr, Captain MC USA

**R**UPTURE of the pregnant uterus in patients previously subjected to cesarean section occurs rather infrequently. According to Brimton,<sup>1</sup> it is seen in only 3 per cent of such patients.

Opinion varies concerning the proper course to follow when confronted with the management of a patient who has had a cesarean section. Some clinics adhere to the old adage "once a cesarean always a cesarean," while others strongly advocate a trial of labor provided certain criteria are met.<sup>2-4</sup>

Concerning the best method of cesarean section, most investigators state that the lower segment procedure affords the safest prognosis, both because the scar is less likely to rupture while the corpus is enlarging during a subsequent pregnancy and because the low transverse cervical scar allows a greater margin of safety in subsequent labors, should the vaginal route be elected for delivery.<sup>1-4</sup>

Gross fetal and neonatal mortality associated with cesarean section has been reported as being higher than that associated with vaginal delivery,<sup>5</sup> and with present day improvements in management of surgical emergencies and the relative infrequency of uterine rupture, especially in lower segment scars, it may not be absolutely contraindicated to consider a trial of labor in selected cases. Schmitz and Gajewski,<sup>7</sup> Lastman,<sup>4</sup> and others<sup>1-3</sup> have reported individually regarding this problem.

The decision to employ vaginal delivery in a case with a history of cesarean section can only be made after a thorough assessment of the integrity of the scar.<sup>7</sup> The absence of tenderness and morbidity following operation does not necessarily guarantee a firm union nor complete protection from possible rupture.<sup>8</sup> The status of the uterine scar could be fairly well assessed through hysterography but this method obviously is of no help

Presented at Armed Forces Obstetrics and Gynecology Seminar 13 April 1956  
Walter Reed Army Medical Center Washington D C.

From U S Naval Hospital San Diego 34 Calif

during pregnancy. It appears, therefore, that no absolute or precise means of estimating the integrity of cesarean section scars is presently available, as is emphasized in recent publications by Watt\* and others\*

When a uterus does rupture before or during labor fetal mortality is high, as reported by several investigators. A study of fetal mortality in 1 219 cesarean sections at Tulane several years ago revealed a 5.7 per cent incidence. When all the cases were analyzed from the standpoint of indication for abdominal delivery, however, it was noted that the greatest incidence of fetal wastage occurred in the group that contained all the toxemias, placental separations, placenta previa, diabetes, and other miscellaneous complications of pregnancy. The remaining cases were uncomplicated elective repeat cesarean sections and accounted for a fetal mortality of only a little more than 1 per cent. This compares favorably with the overall incidence of fetal and neonatal mortality resultant from vaginal delivery. The fate of the infant then, as well as of the mother, is an important consideration to be resolved by the obstetrician when he considers vaginal delivery over repeat cesarean section as a routine policy.

This study critically evaluates our own past experiences concerning this problem. From an analysis of the cases reported recommendations are made as to the safest procedure for both mother and infant to follow when confronted with the alternative of performing repeat cesarean section or vaginal delivery.

The charts of all patients undergoing cesarean section at this hospital for any cause from 1 January 1949 through 31 December 1956 were analyzed from the standpoint of over all incidence of cesarean sections, total repeat cesarean sections performed, total number of uterine ruptures, and actual maternal and fetal mortality intimately associated with vaginal delivery in patients previously subjected to a cesarean section. During the period studied, there were 29 605 deliveries, of which 818 (2.8 per cent) were completed by cesarean section. The indication for operation in 499 (61.0 per cent) of the 818 patients was previous section. Ruptures of the pregnant uterus occurred in 7 (1.4 per cent) of the 499 patients in the previous section group. There were 1 maternal death and 5 fetal deaths, respectively, an incidence of 14.3 per cent and 71.4 per cent, respectively. The latter figure is in sharp contrast to the average monthly gross fetal mortality per 100 live births of 2.0 to 2.5.

The following case reports of the 7 patients with rupture of the pregnant uterus are summarized in table 1.

TABLE 1. Summary of seven cases of rupture of the pregnant uterus in patients with 1 previous cesarean section

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7
Age in year	34	31	31	30	31	31	40
Gest. wt.		5		4	4	2	
Para	1	1	1	1	3	1	3
Week pregnant	36	42	36	3	31	32	3
Pre-labor pain	Chronic	1	Acute	Chronic	Chronic	Chronic	Low
Hour in labor	3	4	2				1
Method of delivery	Abdominal	Abdominal	Abdominal	Abdominal	Abdominal	Abdominal	Vaginal
Operative treatment	Perforation	Superficial laceration	Uterine segment rupture	Low uterine scar, no laceration	Perforation	Uterine laceration	Tamponade
Interval between rupture and delivery	4 1/2 hours	1 1/2 hours	45 minutes	1/2 hour	2 hours	10 hours	2 hours
Extent of rupture	Transverse	Complete	Complete	Transverse	Transverse	Incomplete	Transverse
Maternal mortality							
Fetal mortality							
Post-operative course	Normal recovery	Normal recovery	Normal recovery	Normal recovery	Developed pelvic abscess 7 days	Developed wound dehiscence required secondary closure	Died 3 hours from hemorrhage

## CASE REPORTS

**Case 1** A 34 year old white woman, gravida 2 para 1 had previously had a cesarean section at another hospital. The date and the indication for section were not known. At about the thirty-sixth week of her present pregnancy she was admitted to this hospital with a complaint of lower abdominal pain. A diagnosis of ruptured uterus was made. At laparotomy it was noted that the uterus had ruptured partially in two separate sites. A Porro-type cesarean section was carried out and the patient was successfully delivered of twin male infants both of whom lived. Convalescence was uneventful.

**Case 2** A 32 year old white woman, gravida 3 para 1 had had a cesarean section 4 years previously at another hospital. The indication was not known and the type of section was not mentioned in the operative report. The patient entered this hospital on her estimated date of confinement but was sent home as a case of false labor the following day. Five days later she was readmitted with irregular abdominal pains and was kept under observation. The next day she was examined vaginally and found to be at Station +

2 cm. The membranes were ruptured. Four hours later the fetal heart tones disappeared and bright red bleeding began. A diagnosis of ruptured uterus was made and a laparotomy was performed. The dead fetus and the placenta were found lying free in the peritoneal cavity. Supracervical hysterectomy and bilateral salpingo-oophorectomy were performed. Convalescence was uneventful.

Case 3. A 25 year-old white woman gravida 2 para 1 had had a low cervical cesarean section for premature separation of the placenta two years previously at another hospital. It was elected to give the patient a trial of labor. At 38 weeks she was admitted to the delivery room after having had mild abdominal contractions for about 10 hours. On admission contractions were 3 minutes apart and strong. Tenderness was noted in the right lower quadrant of the abdomen. Continued observation was recommended. Two hours after admission a diagnosis of ruptured uterus was made. A laparotomy was performed and a dead fetus and the placenta were found lying free in the peritoneal cavity. A midline lower segment rupture of the uterus was repaired. Convalescence was uneventful.

Case 4. A 34 year-old white woman gravida 4 para 1 had been delivered 3 years previously at another hospital by a classical type cesarean section for placenta previa. Prior to this she had had 2 vaginal deliveries. It was decided that she should have a trial of labor. At 37 weeks the patient noted sudden onset of hypogastric pain which became increasingly more severe. Physical examination revealed tenderness to the scar area. Fetal heart tones were of good quality. A diagnosis of ruptured uterus was made and a laparotomy was performed. An incomplete rupture was found in a classical scar. A living infant was delivered via a low cervical section and bilateral tubal ligation was carried out. Convalescence was uneventful.

Case 5. A 31 year-old white woman gravida 4 para 3 had been delivered 5 years previously at a hospital on Saipan via classical cesarean section "for breech presentation". At about 23 weeks of gestation the patient noted a sudden severe lancinating abdominal pain when she attempted to lift a heavy object. She was admitted in shock and after improvement in her blood pressure a laparotomy was performed. There were 2 rents in the old scar and about 1,500 to 2,000 ml of blood in the peritoneal cavity. Cesarean section followed by a supracervical hysterectomy was performed. The fetus was dead. The postoperative course was stormy. vaginal drainage of a pelvic abscess and incision and drainage of a subdiaphragmatic abscess had to be carried out. The patient was discharged after 48 days of hospitalization.

Case 6. A 33 year-old white woman gravida 2 para 1 had had a delivery by abdominal hysterectomy at 6½ months gestation at another hospital 4 years previously. The indication was unknown. The present pregnancy was uneventful until 30 weeks when the patient entered

the hospital with a complaint of nausea, vomiting, and abdominal pain for the preceding 48 hours. The preoperative diagnosis was ruptured uterus with small bowel obstruction incident to hemolytic irritation of the peritoneum. At laparotomy it was noted that the uterus had ruptured along a classical cesarean section scar and that a dead fetus and the placenta were lying free in the peritoneal cavity. A total hysterectomy was performed. Postoperatively the patient suffered a wound dehiscence that required secondary closure.

**Case 7.** A 40-year-old white woman, para 7, gravida 3, abortion 3 had been delivered 2 years previously at this hospital via a low cervical cesarean section for central placenta previa. The present pregnancy was complicated at about 32 weeks' gestation by vaginal bleeding and ruptured membranes. Because the baby was premature the preceding cesarean section had been performed at this hospital, and conditions were considered ideal for the procedure vaginal delivery was elected. After 75 minutes of labor, during which a small amount of bleeding was noted, the patient was delivered via low forceps under pudendal block and anesthesia. During delivery vaginal hemorrhage became profuse. The infant's condition was critical at birth and it died shortly afterward in the nursery.

The placenta was manually removed and exploration of the uterine cavity revealed adherent placental fragments in the cornual area. The previous section scar was thought to be intact. Because the patient had bled so profusely and shock had occurred, the uterus was packed and transfusions were expedited; however, when the blood pressure rose, bleeding again became profuse. After 2 hours of this heroic type of treatment, a laparotomy was performed. No blood was found in the peritoneal cavity, but there was a tear in the lower uterine segment in the region of a lower segment scar near the uterine bundle and the cardinal ligament on the left. A total hysterectomy was performed.

After the operation the patient responded briefly, then commenced bleeding from orifices and mucosal surfaces. Despite more blood transfusions and fibrinogen therapy she died 4 hours later.

#### FETAL AND MATERNAL MORTALITY

As mentioned previously, rupture of the pregnant uterus carries with it an increased incidence of fetal mortality. Table 2 which lists pertinent statistics from this hospital and several other institutions, shows that we have the highest fetal mortality and second highest maternal mortality directly attributable to rupture of the pregnant uterus. This situation would, at first, seem to be a direct result of the policy followed at this hospital of vaginal delivery in selected cases of previous cesarean section. Close study of table 1, however, will not substantiate this interpretation. Only 3 patients out of the 7 were allowed to go into labor, and only 1 was delivered electively by the vaginal



TABLE 2 Incidence of rupture of uterus and of associated maternal and fetal deaths at various large obstetrical centers

Ho p tal	Year	T tal del ives	Number of ruptures	Deaths in rupture cases	
				Lat eral	F tal
L ng Memor l Atlanta Ga <sup>3</sup>	1946-51	28,678	6	0	2
	1937-49	35,253	7	0	4
M d cal Col l ge of Va Richm nd Va <sup>12</sup>	1928-47	9,266	9	2	6
Cook County Chicago Ill. <sup>2</sup>	1937-47	111,753	26	1	12
Sloane Hos- pital for Wom n B t lerue Str Vinc nt s kine Coun- ty and Lin- c ln all in New York N Y <sup>2</sup>	1931-50	36,293	6	0	2
Len s Memorial Lat rsty Chr cago Ill. <sup>11</sup>	1921-52	57,167	22	0	7
Wom n s H spital of Gr Luke s N w Y k N Y <sup>11</sup>	1949-56	29,605	7	1	5
U S A v l Ho p tal San D go Cal f					

route. Our single maternal death did, however, occur in the 1 case allowed to deliver vaginally. Perhaps this would decisively influence our thinking concerning the problem of repeat section versus vaginal delivery were it not for the fact that during the period studied several carefully selected patients who had had previous cesarean sections were safely delivered vaginally in our hospital.

#### DISCUSSION

Many investigators have emphasized the increased safety and decreased danger in performing cesarean section in recent years

" The mortality of cesarean section has been reported by several large obstetrical centers to be in the neighborhood of 0.3 per cent.<sup>11</sup> We must remember, however, that 200 maternal deaths a year in the United States are attributed to rupture of the uterus.<sup>12</sup> Brierton<sup>1</sup> reported that 50 per cent of uterine ruptures occurred in the scars of previous sections, of the remainder, 20 per cent were incident to trauma during obstetrical manipulation and 30 per cent were recorded as miscellaneous etiology. Harris<sup>13</sup> reported a maternal mortality incidence of 0 to 11 per cent in the series of Schmitz and McInne. In our own series we sustained 1 maternal death in 7 ruptures, an incidence of 14 per cent (table 2).

Letal mortality associated with rupture of the uterus is exceptionally high, 71 per cent occurred in our own series. The incidence of uterine rupture averages about 1 per cent in women who have had a previous cesarean section. The relative safety of the low cervical operation, which is supported by most obstetricians,<sup>14</sup> is probably open to question, as there is no fool-proof method available to assess the strength or integrity of the scar. This fact must be known if delivery is to be safely accomplished through the vagina.

On the other hand, maternal mortality in the elective cesarean section patient statistically approaches that of vaginal delivery.<sup>15, 16</sup> Letal mortality associated with elective cesarean section and corrected for the complications of pregnancy that do not necessarily attend such an elective section, approaches that of fetal mortality accompanying vaginal deliveries.<sup>17</sup>

In view of the evidence collected, we believe that a trial of labor in the case of a woman who has had a previous cesarean section is definitely a gamble and should not be attempted unless the following criteria can be satisfied: (1) there is no demonstrable cephalopelvic disproportion, (2) the previous cesarean section was of the low transverse segment type, (3) there was no morbidity following the previous section, (4) there is no malpresentation in the present pregnancy, (5) there is no demonstrable scar tenderness, (6) the patient will be attended by an obstetrician throughout her labor, (7) sufficient blood will be available for instant use if required for transfusion, (8) an operating room and team will be available in the event of rupture, and (9) the patient thoroughly understands and accepts the added risk involved. This leads to the inevitable conclusion that the safest method of delivery for the previously sectioned patient is by low transverse cervical cesarean section near term.

#### SUMMARY AND CONCLUSIONS

Analysis of 29,605 deliveries in this hospital during an 8 year period showed 7 cases of obstetrical rupture of the uterus

following previous cesarean section, with 1 maternal death and 5 fetal deaths

Review of the literature reveals considerable frequency of uterine rupture and of related fetal and maternal mortality

A margin of safety is afforded both mother and child by present-day cesarean section whereas important criteria must be satisfied prior to carrying out vaginal delivery in a previously sectioned patient and methods of evaluating the scar for a trial of labor are far from satisfactory

Repeat cesarean section near term is strongly recommended as a routine obstetrical policy in the majority of cases

## REFERENCES

1. Briert n J F Rupture of pr gn at uterus Am J Obst & Gynec 59: 113- Jan 1950.
2. Bak r K Vaginal d liv ry aft r lower uterine cesarean section Surg Gynec Obst 100: 690-696 June 1955
3. Gr ubll J P Principles and Practice of Obstetrics 10th edition W B Saunders C Philad lph Pa 1951
4. Eastman N J Williams Obstetrics 10th d t n. Appl ton-C ntury-Croft Inc New York N Y 1950
5. Meredith R S. Ruptured uterus at Woman's Hospital. Am J Obst & Gynec 70: 84-92 July 1955
6. Struddiford W E and Decker W H Fetal and neonatal risks related to cesarean section Bull N Y Acad Med 28: 640-654 Oct 1952
7. Schmitz H E and Gajewski C J Vaginal delivery following cesarean section Am J Obst & Gynec 61: 1232 1951
8. Liao F R and Decker W H Fetal and neonatal risks related to cesarean section. Obst & Gynec 2: 54-62 July 1953
9. Watt G L Rupture of uterus. Am J Obst & Gynec 59: 490-497 Mar 1950
10. Fitzgerald J E Webster A. and Fields J E Ruptured uterus report of 42 cases Surg Gynec & Obst 88: 652-660 May 1949
11. Parker J C. and Jones G R Rupture of gravid uterus. Am J Obst & Gynec 62: 330-338 Aug 1951
12. King J A. King E L. and Pitt M B Study of fetal mortality in cesarean section. South M J 46: 491-494 May 1953
13. Dau J W W. and Inman J S Rupture of pregnant uterus. J Internat Coll Surgeons 16: 706-715 Dec 1951
14. Harris J R. Jr. Vaginal delivery following cesarean section. Am J Obst & Gynec 66: 1191-1196, Dec 1953

# RADIATION HAZARDS AND MEDICAL X RAY PROTECTION

In Installations of the U S Army, Europe

PAUL A PADEN Colonel MC USA

**T**HE HAZARDS of ionizing radiations, in general, and those attendant to many routine x ray procedures, in particular, have only recently been receiving the consideration they deserve. Laymen, as well as most doctors and dentists, still do not fully appreciate these hazards. Through the years many radiologists and x ray technicians have ignored sound principles of safety. They have lived to regret it. At the Saint George Hospital in Hamburg, Germany, there is a monument in memory of persons known to have died through use of roentgen rays. One hundred ninety nine names are inscribed, and at least three more remain to be added.

## RADIATION AND LEUKEMIA

It is only in the incidence of leukemia<sup>1</sup> that the effect of small quantities of radiation have to any extent been adequately studied. The incidence of this disease is almost twice as great in physicians as in the general adult population, and the incidence in radiologists is over nine times as great as in non radiologic doctors. The increase in incidence in physicians results mainly from the inclusion of radiologists in the statistics, when they are excluded, the slight increase may well be accounted for by the non radiologists who use fluoroscopes, x ray machines, radium or radioactive isotopes. A study of the causes of death in dentists, x ray technicians and others using x ray or radioactive materials would probably show similar startling statistics.

## INCREASE IN RADIATION !

The ever increasing use of x rays in therapy, to say nothing of the use of

a source of power and in the manufacture and testing of nuclear weapons—with the attendant accumulation of waste material and the effects of fallout—are rapidly increasing the radiation hazard and distributing it to the general population. The possible genetic effects on human beings of large doses of radiation are being carefully studied but the results will not be known for several generations. There is increasing evidence, however, to justify the warnings of many careful observers that the irradiation of members of one generation will cause genetic damage in future generations.

The effects of radiation are often extremely slow in becoming manifest. Changes in the skin of a person's face resulting from small accurately measured doses of radiation used in the treatment of acne may not appear for ten or fifteen years. The painful rodent cancer on the hand of an x ray machine repairman who occasionally uses that member for testing may not occur for many years after the last exposure. One of the "American Martyrs to Science through the Roentgen Rays," Dr William Krauss died as a result of malignant changes occurring in the skin of his fingers which had been damaged by exposure to x rays thirty eight years before. At the age of fifteen a boy developed a marked varus deformity of the left knee, from which a foreign body had been removed fluoroscopically ten years before.

The known dangers of fitting shoes by x ray have recently begun to receive proper attention. The time it takes for one person to check the fit of shoes by a glance through the x ray machine is not long enough to present a radiation hazard even at the close distance and at the high milliamperages required for unadapted eyes. Usually, however, if a child is being fitted, he and his parents as well as any brothers and sisters present, in addition to the salesman must see the fitting. The number of feet which have been permanently damaged because of use of those x ray shoe fitting machines will never be known since changes are bilateral and may be attributed to other causes. Many of our own states have wisely regulated the use of these machines or banned them altogether.

#### X RAY UNITS IN USAREUR

There are well over 100 U S Army diagnostic x ray installations and many dental x ray units in operation in USAREUR medical and dental facilities. Less than one half of the medical x ray units are under the constant supervision of a trained radiologist. While many of these x ray units are well screened and safely operated others are hazardous especially to the operators. Screens with no lead glass or with push buttons which are on the dangerous side\* of the screen are examples. In one

heavily loaded installation, when the x ray machine was operated, 50 mr/hr were reaching the personnel in the laboratory across the hall

Dental x ray units are particularly hazardous to the operators and to the occupants of surrounding areas unless shielding is adequate. These units are small and innocent in appearance but are really wolves in sheep's clothing. Because of their very short focal film distances and long exposure times, their use for a full mouth x ray with no filter and with retakes required may expose the patient's face to an erythema dose. The x ray beams reach not only the teeth, in addition, the neck tissues with their abundant lymphatics receive heavy doses. Depending on whether or not filters are used and also dependent on the distance, roentgens delivered may vary from 40-270/min<sup>2</sup>. With the latter higher rate one machine delivered 315 r during a routine full mouth examination without repeat films. For this quality radiation 350 r is considered an erythema dose.

For all diagnostic procedures, particularly for dental x rays and fluoroscopy, external aluminum filters must be employed, 1 mm for radiography and at least 2 mm for fluoroscopy.

### HAZARDOUS FLUOROSCOPIC AND X RAY PROCEDURES

Many fluoroscopic and x ray procedures are hazardous and must receive careful consideration at all times.

1 *Examinations of the abdomen or pelvis during early pregnancy* Be sure that the patient is not pregnant before you order lumbar spine films, a GI series, a barium enema, an IVP or fluoroscopic examination of the abdomen.

2 *Multiple films of the abdomen at any time during pregnancy* Routine pelvimetry by the use of multiple films is of questionable value and may be fraught with danger to succeeding generations, because the examination may need to be repeated to secure adequate information. If there is definite evidence of pelvic deformity by measurement, pelvimetry may be indicated, but its value remains questionable in view of the non visualized soft tissues. If done, the procedure should be reserved for late pregnancy.

#### 3 *Repeated full-mouth dental x-rays*

4 *Repeated examinations of a part of the body, over a period of days, or on a single day during surgery, e. g., a fracture of the femur for position of the fragments during and after nailing.* I am sure many of you have removed a cast and noted that the skin was tanned and peeling. How many have seen this? Why the skin would tan while covered by cast?

- 5 Prolonged fluoroscopic procedures of any nature, particularly with the patient remaining in the same position
- 6 Most hazardous to both patient and doctor is the setting of fractures or attempted removal of foreign bodies under fluoroscopic control These should not be attempted During World War II, in one Service Command alone at least three Army physicians lost fingers and may later die from a one time performance of such procedures

### SAFETY STANDARDS FOR PERSONNEL AND EQUIPMENT

Personnel engaged in x ray work must follow safe practices at all times equipment must be known to be safe, and shielding must be adequate All diagnostic equipment must be operated only under the supervision of a medical or dental officer whose duties and responsibilities are clearly defined and outlined in TB Med 62 In general this bulletin sets up those requirements

1 Equipment must be safe and shielding must be adequate Shielding present may not equal or may exceed the requirements of TB Med 62, but it must be safe Stone, cement plaster and/or lead in adequate quantity are equally efficacious for shielding The shielding requirements of TB Med 62 are ideal, are based on Handbook 41 "Medical X Ray Protection Up to Two Million Volts" and are designed for use in new construction Theoretical ly all departments should meet these requirements, all new construction must The Surgeon General and/or the Department of the Army have usually granted relief for old installations when they are found by survey to be safe The requirements in TB Med 62 are designed to insure that the dose presently considered safe, 3 r per week is not exceeded This rate may be further reduced to 6.25 mr/hr or 104 mr/min for a 48 hour work week with full time work

2 A health folder must be maintained for each individual exposed to x radiation Into this folder must go

a The physical examination record and history report on the person when he starts work in the department, including a chest film report records of follow up examinations made yearly

b A copy of initial blood counts performed at a stated hour on at least two successive days with repeat examinations if indicated

c Copies of blood counts at three or six month intervals, dependent on whether or not monitoring is practiced afterward It is of utmost importance in the case of military personnel that a copy of all blood counts be placed in their permanent 201 files for future reference particularly the repeated original blood

counts made when they started as a radiologic test of a ray technician. Repeated routine blood counts are not all important if continuous monitoring is practiced and a detailed permanent record maintained.

d A statement that the person has read and understands the safety rules of the department.

e A record of the exposure the person has received as indicated by a monitoring chamber or by actual dental films of chest tests showing doses film was worn.

f A copy of the chest film report of the person at 6 month intervals.

g Safety rules must be posted and adhered to. All personnel must understand them.

The following safety rules are used at the U. S. Army Hospital, Neuhrucke, and are considered sufficiently detailed. They may be expanded when desired.

## RULES FOR SAFE OPERATION OF X-RAY EQUIPMENT

### 1 Operation of Radiographic Apparatus

a A competent operator shall be at the control during any radiographic exposure.

b When it is necessary to hold the patient during the exposure no person shall be regularly employed, nor shall anyone from the department of radiology be permitted to perform such service. The person holding the patient should wear lead protective gloves and a lead protective apron. No part of this person's body shall be in the useful beam.

c No persons other than the patient and those needed to hold the patient shall be in the radiographic room during exposure.

d Radiographic work shall be performed with the smallest field consistent with clinical requirements. Always use cones or diaphragms.

e All technicians will insure themselves that they are never outside the control booth when an exposure is made unless they are wearing a lead apron and are as far as possible from the tube and patient. *This method of operation will be tolerated only for special procedures such as angiocardiology and cerebral angiography.*



## 2 Operation of Mobile Apparatus

a The technician *shall* stand as far as possible from the tube and patient during exposure and *shall not* stand in the useful beam

b An operator standing at least 6 feet from the tube and patient should not make more than 15 000 milliamperes seconds of exposure during any one week. This corresponds approximately to the weekly permissible dose. Rotation of operators or wearing of lead protective aprons is required for longer exposures. For his own protection the technician *should always wear a lead rubber apron*

## 3 Operation of Fluoroscopic Apparatus

The fluoroscopic equipment *shall* be operated only by a medical officer of the department of radiology or by a medical officer authorized by the radiologist in charge to conduct fluoroscopic examinations

a The fluoroscopist should have completely dark adapted eyes before proceeding with a fluoroscopic examination

b Fluoroscopic examinations *shall* be performed in the minimum time possible using the lowest x ray intensity and smallest aperture consistent with clinical requirements

c Lead protective aprons *shall* be worn by the medical officer technicians and all other personnel within the fluoroscopic room

d Lead protective gloves *should* be worn during every examination

e The hand of the fluoroscopist either with or without gloves *should never be* placed in the useful beam of radiation

## 4 Operation of Therapeutic Apparatus

a Only the patient *shall* be in the treatment room during exposure except when it is necessary to hold the patient as in the case of small children. No members of the radiological staff or other persons normally near x ray equipment or radio active materials *shall* hold the patient during irradiation. The person holding the patient *shall not* be in the useful beam and *shall* be protected as much as practicable from scattered radiation

b The patient and x ray control *shall* be under observation during exposure

c The useful beam *should* be directed toward unoccupied regions if consistent with therapeutic requirements

4 Maximum permissible exposures must not be exceeded as stated in tables in TB Med 62. It is the responsibility of the doctor or dentist to know the requirements of this directive and to satisfy himself that they are complied with.

To check how safe an installation is from the standpoint of radiation hazards, dental x ray film with paper clips or lead numbers attached may be left for one week on all areas presumed to be safe and then developed. An outline of the clip or letter or any blacking of the film indicates an unsafe condition requiring immediate correction. Obvious lack of shielding should be corrected locally. If doubt still remains as to safe conditions, the Maintenance Section, Rhine Medical Depot, should be requested to perform a radiation survey. They do not at present have adequate personnel or equipment to make routine surveys of all x ray installations.

#### The Ionization Chamber

AR 40 414<sup>a</sup> requires continuous personnel monitoring of x ray personnel by ionization chamber. Chambers and chargers are now available as Signal issue items in accordance with Change No. 1, USAREUR Circular No. 720-5, "Allowances of Supplies and Equipment," dated 21 September 1955. Batteries, BA 51 (67 1/2 volts) and BA 30 (1 1/2 volts) are required for use of the chargers, and if they are not available, they should be requisitioned simultaneously. Difficulty may be experienced with the chargers because of damage in shipment. A small wire loop switch connected to the charging button is the usual source of trouble, causing the central electrode to receive continuously charging current regardless of whether or not the charging button is depressed. Instructional material accompanying the chargers and chambers is complete and informative. It must be thoroughly understood before the instruments are used. The chambers are usually very stable with regard to leakage, and readings as a rule will not be required more often than once each two weeks after it has been determined by more frequent readings that personnel are following safe practices. High readings may occur if safe practices are dropped. Until chambers are in use, a dental film as described above can serve as a rough estimate of the radiation personnel are receiving. For the technician, there should be no blackening, for a fluoroscopist, a faint outline of the clip or letter in a week is allowed, but he should review his procedures.

#### SUMMARY

- 1 Some diagnostic x ray procedures are hazardous.
- 2 Every precaution must be taken to reduce such procedures to a minimum.

## 2 Operation of Mobile Apparatus

a The technician *should* stand as far as possible from the tube and patient during exposure and *shall not* stand in the useful beam

b An operator standing at least 6 feet from the tube and patient should not make more than 15 000 milliampere second of exposure during any one week This corresponds approximately to the weekly permissible dose Rotation of operators or wearing of lead protective aprons is required for longer exposures For his own protection the technician *should always wear a lead rubber apron*

## 3 Operation of Fluoroscopic Apparatus

The fluoroscopic equipment *shall* be operated only by a medical officer of the department of radiology or by a medical officer authorized by the radiologist in charge to conduct fluoroscopic examinations

a The fluoroscopist should have completely dark adapted eyes before proceeding with a fluoroscopic examination

b Fluoroscopic examinations *shall* be performed in the minimum time possible, using the lowest x ray intensity and smallest aperture consistent with clinical requirements

c Lead protective aprons *shall* be worn by the medical officer, technicians and all other personnel within the fluoroscopic room

d Lead protective gloves *should* be worn during every examination

e The hand of the fluoroscopist either with or without gloves *should never be* placed in the useful beam of radiation

## 4 Operation of Therapeutic Apparatus

a Only the patient *shall* be in the treatment room during exposure except when it is necessary to hold the patient, in the case of small children No members of the radiological or other persons normally near x ray equipment or radio materials *shall* hold the patient during irradiation The person holding the patient *shall not* be in the useful beam and *shall* be protected as much as practicable from scattered radiation

b The patient and x ray control *shall* be under observation during exposure

c The useful beam *should* be directed toward unoccupied regions if consistent with therapeutic requirements

# DEVELOPMENT OF A THERAPEUTIC COMMUNITY

## Problems Encountered In Daily Community Meetings

FRANK L. RUNDLE *Lieutenant, VC USNR*  
DENNIE I. BRIGGS *Lieutenant, USN*

**I**N A previous article,<sup>1</sup> we dealt with the initial problems encountered in the operational transition of a closed psychiatric ward in an overseas naval hospital from traditional management methods to those embodied in the concept of the therapeutic community as developed by Jones<sup>2</sup> and Wilmer.<sup>3,4</sup> About 6 weeks after the program was initiated, the previously described daily group discussions on the closed ward were extended to include the entire service. The size of the group meetings after the open ward was added reached a maximum of 120 patients and staff.

For several weeks, developments were satisfactory and encouraging, and then a series of incidents occurred that necessitated dividing the community into two separate parts, the closed and open wards. The most important factors involved in this disorganization were the marked heterogeneity of the patient population, premature relaxation of some of the former closed ward restrictions, and a lack of adequate communication between members of the staff and between staff and patients. After about three months it was again possible to establish the service as a total community, and it has been operating as such since that time.

One of the most important results of the adoption of the community method has been the elimination on the closed ward of all forms of mechanical restraint, including seclusion rooms. These have been used during the past five months only for segregation of disturbed drunk patients. The use of sedation on both wards is now rarely necessary, and the ataractic drugs are used only occasionally to control severely anxious and disturbed individuals.

Currently all patients and staff meet for 45 minutes 4 times a week for the community group meeting. Following a 15-

---

From U. S. Naval Hospital, Yokosuka, Japan. Dr. Rundle is now at the New York Clinic, New York Hospital, 525 E. 68th St., New York, N. Y.

meeting, the staff meets to bring together all information available about patients and to discuss the meeting just held. Subsequent to that the closed ward patients meet with the ward corpsmen for a second group discussion. In addition many open ward patients are assigned to small therapy groups, these being led by the nurse and senior corpsman, under supervision of the medical officers. A few patients are given individual psychotherapy, but the treatment for most is almost entirely within the community setting. In addition to the meetings described, the closed ward staff meets early each morning to exchange information and observations, and one afternoon weekly the entire staff meets in a group designed primarily for working out staff interpersonal difficulties.

During the period covered by this article, a number of problems arose repeatedly. They will be presented here, together with some of the methods developed to deal with them.

### PROBLEMS OFTEN ENCOUNTERED IN COMMUNITY MEETINGS

**Here and Now Problems.** Jones<sup>2</sup> and Wilmer<sup>2</sup> have pointed out that often the most important material for treatment is contained in day by day behavior and the feelings involved in interpersonal relationships. Initially the importance of dealing with these obvious factors was overlooked, instead, patients were encouraged to reveal and discuss deep inner feelings and ideas. As a result many opportunities that arose in the frequent interpersonal difficulties were lost. When it became clear that this was the case, the emphasis was shifted and all members of the community were encouraged to bring up the small aggravations, annoyances, tensions and resentments that arose within the community. In many cases this led to discussion and working through of underlying personal problems even though they were not primarily emphasized.

**Naming Names.** In this community there has been extreme reluctance to reveal names of persons discussed, when the behavior involved was in any way antisocial, unacceptable, or could be considered an offense under military law. For instance a patient may bring up in the group meeting, "There's a patient drinking on the ward, I'm not saying who it is but..." In such a case he would be interrupted and asked to name the person about whom he was talking. If he refused he would be discouraged from continuing unless the person involved should speak up. If the person did not speak up the group would be asked whether anyone could assist in determining who was being discussed. If this failed the matter would be allowed to drop even though it would seem important that the issue be settled. The exposure of antisocial behavior before the group usually causes embarrassment and discomfort in the individual concerned and resentment to-

ward him by his peers. These factors constitute social pressure, which if handled properly may be used effectively to bring about alterations in behavior patterns. If names are not revealed, this pressure cannot be usefully employed. The staff is also required to identify persons discussed, and many times the patients will call their attention to the need to do so.

Another reason it is believed necessary to name names is to prevent introduction to the group of factually inaccurate information. On one occasion, a 17 year old youth with a basically schizophrenic make-up, whose constant acting out was provocative and designed to arouse hostilities between patients and staff, asked what would be done if it were learned that narcotics were being brought on the ward. At that time it was not insisted that he make clear what he meant and name those involved, the discussion continued on a hypothetical level, and three patients who were under investigation for narcotics use became extremely angry and disturbed as they believed that suspicion was being cast upon them. Other patients seemed to become angry and anxious about the situation, and it was only after several meetings that all the feelings and tensions had been worked through and the facts of the matter established. Most of the difficulty could have been avoided had the person who introduced the subject been forced to name names or admit that he had no reason to think that narcotics had actually been brought on the ward.

Patients often took the attitude that informing on persons involved in illegal activities would be "squealing" or "ratting" and that this would disrupt friendships and social standing on the ward. Sometimes patients openly interfered with the efforts of the staff to encourage the revealing of such information. In such instances, the staff pointed out that withholding information which aided another to escape detection of antisocial behavior was not helping him in terms of real treatment, which was the object of his hospitalization. Occasionally the example was cited by staff or patients of a patient who a few months before went AWOL and later was found dead of an overdose of heroin. Many patients on the ward knew that he was going AWOL and, in fact, some co-operated with him, but none had alerted the staff. In this instance it was clear that had someone "squealed" it would have been a worthy and constructive action.

When the person named in cases involving socially unacceptable behavior is a member of the hospital staff, it is important to have that person present even though he is not a member of the psychiatric staff. In some instances, staff personnel from other departments, such as the master-at-arms staff, who were named by patients as having been involved, were invited to attend the group meeting, with beneficial results for the com-

munity and for themselves. In some cases the person named was in such a position that it was impossible to obtain his presence at the discussion; this was one of the disadvantages that was inherent and unalterable and hence had to be accepted.

**Confessions.** It was found that it often was unwise to allow patients to be "pressured" by the group into discussing a matter of deep personal concern that would be in the nature of a confession, because it would make the person liable to legal proceedings. This problem arose chiefly in connection with sexual matters that under the Uniform Code of Military Justice are illegal, particularly homosexuality and other perversions. In this military setting it was found that it was impossible to deal with such matters therapeutically because of legal and administrative attitudes as well as the secondary attitudes that arose from them. In a few instances in which group pressure resulted in confession of material that could not be adequately worked out, the effect on the person involved and the group as a whole was considered to be detrimental. If a staff member realized that a patient was being pushed toward revelation of such personal, highly charged emotional material, the process was interrupted directly.

**Legal Entanglements.** Related to the problem of naming names and handling confessions was that of what action to take when cases of infraction or violation of laws or regulations arose in the group meetings. The social pressures operative within the therapeutic community were such as sometimes to cause information to be revealed that could lead to legal action and punishment. This arose most frequently in instances of drinking or gambling in the hospital, going AWOL, and financial indebtedness to other patients. In such cases the decision was made individually as to whether taking legal action would be beneficial in terms of conscience development or relief of guilt.

Sometimes the decision as to whether legal action should be taken was influenced by the manner in which the community responded to the situation. It was interesting to see how emphasis on honesty and truthfulness and conformity to social rules and customs sometimes promoted the acceptance of such qualities by patients. Often patients would seek private interviews to reveal their own infractions of rules, knowing full well that to do so was to invite legal action. In the community, it was emphasized that members must face their social responsibilities to the group and that they should not seek to escape punishment by private revelation of guilt. Sometimes patients on the eve of their departure from the hospital would confess to having committed some illegal act, stating that they just could not leave without "getting it off their chest." On occasion they offered con-

crete suggestions as to how we could help other patients who engaged in such behavior, usually indicating that they believed the staff's attitudes to be too lenient.

**Antisocial Behavior.** Situations which were indications for legal action have been discussed, but in the therapeutic community problems constantly arose that involved antisocial behavior of a nature which would not justify formal legal action. Examples of such behavior were failing to observe reveille, refusal to perform work details, making noise after taps, and using the property of others without permission. Such matters, although they seem minor, often led to intense friction and hence were the subject of discussion in the large group meetings.

When such behavior was discussed, the offender was first asked if he could explain his actions to the group, then the group was asked to express opinions and feelings. Patients and staff have indicated many times that on occasion they had conformed to rules and social expectations because they dreaded having their actions examined and discussed by the group.

There were certain situations involving antisocial behavior that consistently caused considerable tension and tended to disrupt the community, hence the rules and social requirements were strictly enforced. Examples of such situations were nonattendance at group meetings, gambling, consumption of alcohol within the hospital, and borrowing money. When possible these matters were dealt with within the community, but in some cases legal action was taken. On one occasion a patient was placed on report for deliberately evading attendance of group meetings despite repeated warnings, for this, and the fact that he lied when he appeared at Captain's Mast, he was awarded a court-martial. At that time this action seemed drastic, but in the long run the effect was beneficial to the community and to the patient.

Occasionally antisocial behavior of a staff member on or off the psychiatric service was discussed in the group meetings. In such cases the situation was handled no differently than if it were a patient who was involved, so as to make it clear to staff and patients that the staff as well as the patients were expected to conform to community rules and customs. Once a staff corpsman from another hospital department aided a psychiatric patient in going AWOL and also borrowed money from him. This staff man was invited to attend the group meeting and was asked for an explanation. The patients in general tended to excuse and defend him, but the outcome was that he was placed on report and legal action was initiated.

One of the greatest difficulties in regard to the problem of minor acting out by patients was a lack of consistency among



the staff corpsmen in enforcing rules. For the most part this has been overcome by an active teaching program and frequent staff meetings wherein efforts are constantly made to maintain open communication among the staff. Another problem was that the staff corpsmen were reluctant to introduce to the group information concerning relatively minor antisocial behavior by patients or staff. They seemed to feel that such things were not important enough to warrant the group's consideration. Also at first there seemed to be an attitude that this would be "squealing." This problem was gradually overcome as the staff became educated and experienced and felt secure in their position in the community.

Recently it seemed that in the group discussions too much emphasis was being placed on the misbehavior of patients which led to the attitude among many of the patients that they were being "placed on trial." In retrospect it appeared that the approach was too moralistic without sufficient effort to understand why such behavior occurred. When this was realized, a deliberate attempt was made to shift the emphasis. At present it cannot be said which approach was the more useful in the operation of this particular therapeutic community.

**The Indefinite Answer** Sometimes patients indicated in the group meetings that they were angry with or disappointed in the staff because questions or issues were not squarely met and answered or settled. In general questions directed to the staff were reflected back to the person asking them or were passed on to the group, as often a question was asked primarily as an opening for discussion rather than to obtain a direct answer. Sometimes it was necessary to answer a question directly and concretely. This was so especially with questions concerning psychiatric illnesses, diagnoses, theories and treatment. In such cases a simple, honest, direct answer was useful in educating patients, in clarifying misconceptions in allaying anxiety and in removing the shroud of mystery that so often surrounds such matters.

When a question discussed in a meeting appeared not to have been adequately answered a staff member would state the issue, summarize the discussion and give an explanation or answer if possible. If none was possible he would say so plainly. Often patients remarked "Why not just say there is no answer, rather than beat around the bush?"

**Only the Doctor Can Help Me** An opinion frequently expressed in the discussions was that because most of the group were patients and had problems of their own it would be futile to introduce personal problems to the group for their consideration and assistance. Another phase of that attitude was the belief held by most

patients when they came to the hospital, that any help must come from the doctor himself. To many, being a patient involved passively co-operating with the doctor's orders in the hope that relief from distressing symptoms would ensue. Perhaps this procedure would work in some aspects of medical or surgical treatment, but in psychiatry it would be inimical to the treatment process.

When a patient in the meeting brought up his feeling that only the doctor could help him, several approaches were utilized. Obviously there were occasions when the reality situation was such that only individual psychotherapeutic treatment could be expected to give relief, and this was arranged for when possible. In other cases, in which it was believed that the therapeutic community effect would be beneficial, the approach was designed to aid the person in understanding how the community operated and what could be expected if he entered into it. One way of dealing with the problem was for one of the doctors present to call attention to his presence and that of other doctors, and to point out that they were there to help in any way they could. Another approach was to make a simple statement that in the past it had been found that patients could be of great help to other patients. Sometimes it was pointed out that in cases involving difficulties in getting along with people, working them out with the doctor alone would not necessarily ensure that the solutions could be applied outside the individual therapeutic setting. It was pointed out that in some cases the working through of such difficulties in a large group would be more beneficial. Often, patients who had been in the hospital for some time gave "testimonials" that they actually did receive benefit and assistance from other patient members of the group.

From the beginning a deliberate attempt has been made to foster the attitude that patients, as members of the community, have responsibilities in the treatment of other patients. This attitude was developed and perpetuated only by constant and persistent efforts by the staff. An example of a way in which patients shared with the staff in the treatment of a patient was that of a career Navy man who had made a nearly successful suicidal attempt. On the closed ward, under the unobtrusive supervision of the staff, the patients stood "special watches" over him and aided in his nursing care. Later, when this patient was ready for transfer to the open ward, he requested that he be allowed to remain on the closed ward in order that he might share in the treatment of more seriously ill patients and thus discharge his "debt" to the community and show his gratitude to the group. Following extensive surgical repairs and physical therapy, this patient was restored to full duty.

An important part of functioning of the therapeutic community as developed here was that the patients shared directly with the staff the responsibility for care of psychotic patients, especially those who were seriously disorganized. Several patients who were confused, disoriented, agitated, hallucinating, and delusional were cared for by patients in co-operation with the staff in such a manner that these patients were never left alone except when they slept. In some cases, catatonics were "forced" to leave their beds, play games, eat meals, take showers, and shave, through the efforts of the group. They were never abandoned to their private autistic worlds of fantasy, hallucinations, or delusion. They were faced with reality nearly 24 hours daily which included their being drawn into social relationships, both individual and group. Sometimes disorganized patients during lucid intervals would adopt this helpful attitude toward others who at the moment were less well than they. In several instances, acutely schizophrenic patients showed dramatic improvement after 2 or 3 days of such treatment. Such improvement not having been observed prior to institution of therapeutic community methods. Of course there were other schizophrenic patients who did not improve. Because of the short time period involved and the lack of follow up information on these patients, it is impossible to draw any conclusions as to the efficacy of this treatment in terms of the over all disease process. It is believed, however, that because this treatment was begun within hours or days of an acute psychotic disorganization with at least interruption of the disease process, the likelihood of its having permanent beneficial effect would be great.

The limitations of community means of treatment are realized, in that emphasis is on social recovery rather than on personality reorganization. However, if the means to do individual interpretive psychotherapy are not available, social recovery is an important achievement and may have equally ambitious goals.

**There's Nothing Wrong With Me** Inasmuch as the majority of patients with whom this article deals were admitted to the hospital not because of their own request for aid but because of personal external circumstances, there were many who maintained the attitude that there was nothing wrong with them and that they should not be in the hospital. This was in fact true of some patients and they were returned to duty as soon as possible. Those who were retained despite their belief that it was unnecessary were particularly resistant to acculturation into the therapeutic community and often attempted to disrupt the group discussions with their insistence that they were perfectly well and should not be in the hospital. This situation was usually recognized by other patients who had been in the community for some time and were

quite skilled at uncovering and pointing out denials, inconsistencies, and rationalizations. When the group did not do this spontaneously, a staff member posed the question, "Does anyone see any reason why this man should be in the hospital?" This usually was sufficient to start the process of dealing with the man's resistances. One of the most effective functions of the community was in demonstrating to nonpsychotics that internal factors often were more responsible for their maladjustment than the external factors they frequently blamed. The psychotic patients who used paranoid thinking presented somewhat the same problem, and in many cases they responded to group processes in such a way that their paranoid systems were either modified or more narrowly delimited. The other patients soon recognized that such persons were very ill, and responded to the staff's requests for assistance in defining reality to them.

**Sharing of Feelings by Staff** One of the most difficult problems encountered and one which still remains is that of the staff's reluctance to share their feelings with patients and with each other. It is difficult to know just how much personal information and feelings staff members should reveal in group discussions. In general it is believed that any feelings that, when unexpressed, interfere with any phase of community functioning or relationships should be openly discussed if the occasion arises. Initially, it seemed that the ward corpsmen were reluctant to follow this course, because they saw in it an obliteration of the distinctions between them and the patients. The natural extension of their thought was that they themselves might be considered to be mentally or emotionally ill.

It is not possible in the therapeutic community for the feelings and behavior of any member, including the staff, to be immune from scrutiny, because all are interrelated. This problem has been stated by Jones:

If the concept of free communication and analysis of current tensions is implicit in the treatment ideology of a therapeutic community, it is difficult to see how the staff can escape the need to face this challenge. A distinction is sometimes made between what is relevant to the treatment situation and what pertains to the individual's private life.<sup>4</sup>

It is not believed that this aspect of this community's functioning has yet been worked out satisfactorily. Recently a change was instituted to require all available staff members to attend all large group meetings and all staff conferences, and it is believed that this was a step in the right direction. Daily staff meetings following the large group meeting are still held in addition the closed ward staff meets early in

a weekly meeting has been established in which staff members are encouraged and in fact urged to express their feelings about each other freely or about patients if the feelings constitute a hindrance in their dealings within the community. Progress has been slow insofar as staff members freely expressing feelings about each other is concerned. In general it is believed that such an approach is necessary. Recently in a meeting one of the enlisted staff members expressed his personal antipathy toward one of the staff officers present. This was considered to have been a real achievement in terms of the overall process because military protocol and training is such that this is not easily discouraged but prohibited. The author considers that the difficulties manifest in this staff uncommunicativeness are bound up in what might be called a group transference neurosis which has developed. It is believed that if this can be worked through the everyday conflicts and difficulties which arise among the staff will be much less of a problem.

### SUMMARY AND CONCLUSIONS

This article reports some of the problems that repeatedly arose in the daily group meetings of a therapeutic community and the methods developed to cope with them. The community is still in a transitional stage but it is believed that other hospitals will experience similar transitions in adopting community methods of treatment.

Community methods of treatment focus on social tensions existing between patients, between staff members, and between staff and patients. The daily group meetings seen as teaching and learning situations for good social behavior have been used to create a climate in which interpersonal tensions existing within the community. In the developmental stages of creating such an atmosphere it was found necessary to deal directly with certain issues that arose frequently within the meetings. We found it necessary to require patients and staff to reveal the identity of persons involved in the discussions who had committed antisocial or antisocial acts. Because of the shortness of the length of stay for most patients the enculturation process and conscience development had to be hastened. In some instances this necessitated legal action toward an individual member for the welfare of the community. For the most part these matters were handled successfully within the group.

Passive dependent attitudes of members toward their participation in the community came up frequently. These were treated as responses to treatment and were verbalized in the meetings in such comments as the staff evaded answering their ques-

tions, that the group could not help individual members with their problems (that they required a doctor's aid), and that they had no problems.

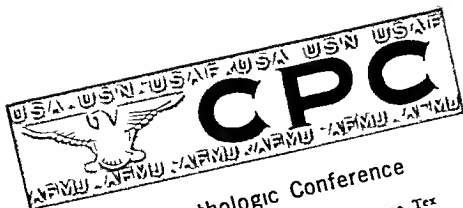
The participation of the staff in the community still remains unsettled. Some of the staff felt insecure in the relaxation of former controls, and were only slowly able to transform to new roles in which they could feel comfortable.

---

ACKNOWLEDGMENT We are grateful to Captain Irs C Nichols MC USN for his advice and to the nurses and hospital corpsmen who participated in this program in particular to Commander Ellen Dolloff NC USN Lieutenant Commander Mary Wolfgang NC USN Lieutenant Marion Watdell NC USN and Ben Geiger Hospital Corpsman second class, USN.

#### REFERENCES

- 1 Rundle F L and Briggs D L. Beginnings of therapeutic community *U S Armed Forces M J* 8 811-819 June 1957.
- 2 Jones M. *Therapeutic Community* Basic Books Inc New York N Y 1953.
- 3 Wilmer H A. Psychiatric service as therapeutic community *U S Armed Forces M J* 7 640-654 May 1956.
- 4 Wilmer H A. Psychiatric service as therapeutic community ten month study in care of 939 patients *U S Armed Forces M J* 7 1463-1469 Oct 1956.
- 5 Jones M. Personal communications.
- 6 Briggs D L. Hospital corpsman as social therapist: an important role in psychiatric treatment *M Tech Bull* 8 169-176 July-Aug 1957.



## Clinicopathologic Conference

U S Air Force Hospital Sheppard Air Force Base Tex

### JAUNDICE IN INFANCY

**Summary of Clinical History** A 6-month-old white male infant was transferred here from another hospital with a history of jaundice since birth which had persisted without significant change. The urine was described by the mother as frequently darker than normal but never dark orange or brown in color. The stools were said to have been intermittently "clay colored." The patient had several episodes of vomiting and diarrhea since birth the most severe of which occurred at the age of four months when he was admitted to another hospital. Rapid improvement occurred with treatment. The patient also had had a mild non-productive cough for several months. Despite these symptoms he gained weight regularly. Several weeks before admission to this hospital it was noted that his abdomen had begun to distend.

**Physical Examination** Examination revealed a well nourished well developed white male infant with definite icterus of the skin and sclerae. The heart and lungs were normal on examination. The abdomen was slightly enlarged and the liver was palpated four fingerbreadth below the right costal margin. There was an equinovarus deformity of the right foot.

**Laboratory Studies** Initial laboratory findings were as follows:  
erythrocyte count 3 700 000/ $\mu$ l hemoglobin 10 0 grams/100 ml

From the Surg al Serv c A th time of th onf rence Col Marshall N J n en  
USAF (MC) was Commanding Off c and Ch l f th s r v c Col J n s n n  
at 2631 Lafayette Winter Park Fla

leukocyte count, 4,100/ $\mu$ l, with 84 per cent lymphocytes, 12 per cent neutrophils, 2 per cent monocytes, and 1 per cent eosinophils. Bone marrow aspiration revealed 270 nucleated red blood cells per 100 white blood cells. The reticulocyte count was 2 per cent and fragility studies were in the range of normal. Bilirubin was 7.7 mg/100 ml, with a prompt direct van den Bergh reaction. The icteric index was 40 units. Prothrombin time was 13 seconds (control, 16 seconds), and cephalin cholesterol flocculation, 2 plus in 48 hours. Urobilin could not be demonstrated in the stool. The alkaline phosphatase was 7.8 Bodinsky units. The serologic test for syphilis was negative.

**Course in Hospital.** The patient showed little change for two weeks, during which the presence of acholic stools was confirmed on two occasions. He then developed frequent paroxysms of coughing which became relatively severe and were occasionally followed by vomiting. The pharynx was moderately injected and filled with rather thick mucus. Coarse rhonchi were heard throughout the chest. Additional laboratory studies revealed a leukocyte count of 16,000/ $\mu$ l with 67 per cent lymphocytes, 6 per cent of which were reported as atypical. A culture from the throat grew *Micrococcus pyogenes* var *albus*. Roentgenograms of the chest were read as negative. The patient was treated with various antibiotics with gradual disappearance of the cough and vomiting over a three-week period. At this time a laparotomy was performed.

#### DISCUSSION

**Doctor Sullivan:** This is the case of a 6-month-old white male infant transferred here with a history of jaundice since birth. The urine was described as frequently "darker than normal" but never "a dark brown." The stools were said to have been intermittently "clay colored." The patient had several episodes of vomiting since birth, the most severe of which responded to symptomatic treatment. There was a mild and non-productive cough for several months. In spite of these symptoms the patient gained weight steadily. Several weeks prior to his admission it was noted that his abdomen had begun to distend.

Examination revealed a well-developed, well-nourished white male infant with definite icterus of the skin and scleras. Examination of the heart and lungs was within normal limits. The abdomen was slightly enlarged, and the liver was palpable four fingersbreadth below the costal margin. In an average baby the liver will be one or one and a half fingersbreadth below the costal margin. A liver four fingersbreadth below the costal margin will be down near the umbilicus. The foot deformity is not significant.

The red blood cell count was 3,700,000/ $\mu$ l with a hemoglobin of 10 grams/100 ml, which concerns many who do not deal with children.



## U S ARMED FORCES MEDICAL JOURNAL

1352

The average baby at six months of age will have a hemoglobin of around 11.2 grams/100 ml. The hemoglobin and red blood cell count in this patient do not necessarily indicate anemia, particularly as these findings are not too accurate in any laboratory and because a lot of children live on milk only. The profound anemias of childhood will be much more severe than this. In truly anemic children of six months of age a hemoglobin of 6 or 7 grams/100 ml is not uncommon.

The reticulocyte count was 2 per cent. As a normal count for this age group is about 1 per cent, this could easily be within normal limits. It does not mean much if no more than that. The fragility studies were within normal limits. The icteric index was 40 units, which corroborates the reported elevated serum bilirubin. The alkaline phosphatase was 7.8 Bodansky units, a finding within normal limits.

The child had a benign course without change for two weeks during which time the presence of acholic stools was confirmed on only two occasions. In our ward we have the nurse save the stools and we examine them ourselves. A lot of times this is much more reliable than ordering urobilinogen tests et cetera, from the laboratory. Other examinations of the stools are not reported, but only twice did the infant have really clay colored stools and this may be truly significant. He then began to have paroxysms of coughing. The larynx was moderately injected and filled with mucus. Coarse rhonchi were heard throughout the chest. The previous respiratory infections described were not particularly abnormal in frequency. The blood cell count at this time was peculiar in that there was a leukocyte count of 18,000/ $\mu$ l with a marked preponderance of lymphocytes. The infant had a pharyngitis and a bronchitis and responded to antibiotics over a three-week period. Then a laparotomy was performed.

There are in children problems more common but probably none more interesting than that of jaundice. In my pediatric practice next to upper respiratory infections I have probably seen more cases of jaundice than of anything else. The case that I usually see is that of a child two and a half to four weeks old with a physiologic jaundice a little more extreme and a little slower to clear than we are accustomed to seeing. Physiologic jaundice usually starts about the third or fourth day and the process is most extreme by the sixth to ninth day. It usually clears by the 14th day but this is not always true as I have seen it last for a little bit longer. Serum bilirubin findings during the height of physiologic jaundice have been reported as high as 20 mg/100 ml which is greatly elevated.

The next most common entity that we see is erythroblastosis fetalis, but this is an acute illness that occurs in the first few days of life. Inspissation of bile with obstructive phenomena and liver cell damage can occur but does not fit this case because the patient had no history of difficulties in the neonatal period. Sepsis can produce jaundice but is associated with the critically ill. In the absence of good therapy such children do not live long—certainly not six months.

Congenital syphilis produces profound anemia in acutely ill children, multiple areas of periostitis and all the other symptoms of congenital syphilis that have not been described in this child.

There are certain infections that involve the liver in the newborn period and infancy that might fit the picture we have described here. In the past two years there have been numerous reports of homologous serum jaundice being transmitted from the mother to the child. It is surmised that this is one of the causes of congenital abnormalities of the extrabiliary and intrabiliary duct system.

The viruses that cause herpes simplex in adults and herpes stomatitis in children may also produce transplacental infections. The parents reported have had a rapid fulminating hepatitis which shortly terminated in death. To my knowledge cases with a long course simulating an obstructive jaundice have not been reported.

Another disease in infants that we have become acquainted with in the last few years is infectious mononucleosis presenting only jaundice, hepatomegaly and splenomegaly. This picture could well fit this child. The only really remarkable abnormality in the blood cell count is the marked preponderance of lymphocytes which again we see occasionally in infection in children. A heterophile antibody test was not reported in this case. The congenital biliary obstructions are the diseases most likely to be found in this age group. At times they are quite confusing. These children grow and do well but they have stentorhea with increasing jaundice and their stools are clay-colored more or less constantly. This child was here some six weeks and the stools were noted to be clay colored on only two occasions. Probably a diagnosis of absence or complete atresia of the hepatic ducts with complete obstruction is not justified. The picture is perfectly compatible with congenitally small bile ducts with intermittent or insufficient biliary drainage. The inspissation of bile causing temporary plugging has been discussed at great length, and there have been a few such cases reported. I have had the privilege of seeing and following one such case.

Fibrocystic disease can occasionally involve the liver, primarily in association with repeated upper respiratory infections. If this were true in this case you would certainly anticipate stentorhea, more diarrhea than is described and a malnourished child who is not doing well. It would be most unusual for fibrocystic disease to derange hepatic function to the degree present in this patient without more evidence of lung and pancreatic involvement.

For my diagnosis, then, I would list first some congenital abnormality causing temporary or intermittent obstruction of the bile ducts. Infectious mononucleosis is my second choice, and hepatitis due to homologous serum jaundice is my third.

Doctor Chamberlain I think that Doctor Sullivan has covered the differential diagnosis and clinical aspects of the various forms of jaundice in the newborn infant quite well I think that we are forced to conclude that this is an obstructive type of jaundice simply because the clinical picture does not fit a hemolytic type of jaundice and the hepatitis although possible does not seem to be quite as likely as the obstructive type By and large the majority of the obstructive types of jaundice in infancy are caused by atresias of the biliary tract which can take multiple forms If the intrahepatic passages and the upper portion of the hepatic ducts and the common bile duct are patent the case is potentially curable by surgical means It is not possible and certainly not practical to differentiate at all times the exact type of obstructive jaundice present Once the diagnosis of obstructive jaundice is made an exploratory laparotomy is obligatory to find exactly what is going on and whether or not the patient can be cured If the passages in the liver and the upper portion of the common bile duct are patent the common bile duct or sometimes the gallbladder can be anastomosed to the duodenum If the atresia takes place within the liver of course it cannot be corrected surgically In this event the incision is closed after removal of a biopsy specimen of the liver and exploration of the bile duct By and large a stricture high up in the hepatic ducts even though extrahepatic is difficult to treat surgically

The other causes of obstructive jaundice in the newborn infant have been mentioned Inspissated bile frequently seems to be associated with obstruction of a small bile duct although we cannot actually call these atresias It is probable that if the bile ducts were not small the bile would not become inspissated.

Erythroblastosis fetalis is more frequently associated with inspissated bile than any other single disease and the reason for this is the excess bile pigment and debris I think that erythroblastosis with inspissated bile producing this degree of jaundice is unlikely here for reasons that have been mentioned—the patient should have had a profound anemia and a little different clinical course

Large lymph nodes pressing on the bile duct can cause jaundice which is typically intermittent and thus could be due to any disease that causes lymphadenopathy Any neoplasm in the neighborhood of the bile duct can cause obstructive jaundice but in infancy such lesions are quite rare

A cephalin-cholesterol flocculation of 2 plus and hepatomegaly are consistent with obstructive jaundice of six months duration because there is usually a fair amount of secondary biliary cirrhosis in these patients The evidence of intermittent jaundice bilirubin of 7.7 mg/100 ml and icteric index of 40 units are slightly

against biliary atresia because most patients with atresia lasting for six months have more intensive jaundice than this.

In this hospital the patient was noted to have acholic stools on two occasions. I do not know from the protocol whether that means that the stools were only examined two times or whether they were examined at other times and were not found to be acholic.

Doctor Jensen: There is nothing in the chart to indicate that there was ever bile in the stool.

Doctor Chamberlain: Apparently the jaundice did not vary in intensity but sometimes this can be misleading. It is difficult for parents to be able to estimate the degree of jaundice especially if the jaundice should increase slowly. I think the biggest point against an inspissated bile syndrome is that after six months the patient still had about the same amount of jaundice as he had at the beginning. I believe we all agree that laparotomy was indicated in this case.

*For a diagnosis I would have to say that biliary atresia was my first choice and inspissated bile syndrome a close runner up.*

Doctor Warner: Not very much has been said about the possibility that the jaundice was caused by a pigment calculus for this child may have had hemolytic anemia. If that were the case we have ample evidence that there was an obstructive jaundice even though it may have been intermittent. I do not see that the peculiar hematologic findings have been satisfactorily explained. There is, on one hand the relative lymphocytosis and on the other evidence in the bone marrow of increased erythropoietic activity in association with a relatively normal reticulocyte count. The absence of a palpable spleen would be unusual with hemolytic anemia or with such prolonged obstructive jaundice. This patient had actually had obstructive jaundice for six months and so I would expect that whatever the cause there would at least have been a slight degree of biliary cirrhosis. The protocol mentions a swelling of the abdomen for several weeks just prior to admission and perhaps this was the beginning of ascites. At any rate I think that the possibility of hemolytic anemia with a bile pigment stone has to be considered and that certainly, whatever the cause of the obstructive jaundice early biliary cirrhosis was also present.

Doctor Jensen: We might mention one other possible diagnosis in this discussion that is the so called cyst of the choledochus. This patient however is a little young to have this lesion. The word cyst is a misnomer because these lesions are due to an enlargement of the common duct similar to megaloureter or possibly Hirschsprung's disease. Jaundice usually occurs later than in this patient. The discussion of this case, I think, depends to some extent on the accuracy of the history. Whether or not the jaundice actually fluctuated or

the stools contained bile during this time is most important but it is almost impossible to determine these events from the history as given. The history concerning the pregnancy and delivery was apparently non-contributory. Doctor Wilson do you have any comment regarding the blood picture?

Doctor Wilson The values as reported are rather unusual. The child seemed to be anemic as the hemoglobin was 10 grams/100 ml and the red blood cell count 3 700 000/ $\mu$ l. The white blood cell count of 4 400/ $\mu$ l was certainly low for a child of his age and 84 per cent lymphocytes was abnormal. The differential count in a child of this age usually includes about 60 per cent lymphocytes. The bone marrow aspiration was rather vaguely reported it being stated that there were 270 nucleated red blood cells but it was not stated whether these were normal maturation of the red blood cells. We do not know whether these were primarily normoblasts whether they were erythroblasts or if any megaloblasts were present. A ratio of 270 nucleated red blood cells per 100 white blood cells is rather high unless there has been a depression of the white cell series. Usually there are around 400 white blood cells per 100 nucleated red blood cells. This finding and the anemia would definitely be consistent with marked hemolysis however a reticulocyte count of 2 per cent is not consistent. Fragility studies were in the range of normal. I assume that this was saline fragility. We have been given no description of the red blood cells in the peripheral blood. It certainly would appear that some hemolytic process was going on or that marked depression of the myeloid element of the bone marrow was present.

Dr Sullivan's diagnosis  
Congenital abnormality of the bile ducts, or infectious mononucleosis or hepatitis due to homologous serum jaundice

Dr Chamberlain's diagnosis  
Biliary atresia or inspissated bile syndrome

Doctor Morsh At laparotomy this child was proved to have a complete obstruction of the hepatic duct just proximal to where the cystic duct joins the hepatic duct to form the common bile duct. The hepatic duct proximal to the obstruction was dilated approximately 3 cm and distended with bile. The gallbladder was present and appeared to be normal. A side-to-side anastomosis between the hepatic duct and the jejunum was done. Postoperatively the child did well for about four days and bile reappeared in the stool. On the fourth postoperative day the child became lethargic and developed a fever up to 104 F. He became comatose and died on the following day.

Capt William L. Wilson USAF (MC) then Chief Medical Officer  
Capt Robert L. Morsh USAF (MC) then Chief Laboratory Sergeant

## PATHOLOGIC FINDINGS

The autopsy was restricted to the abdomen through the surgical incision. Examination of the liver, duodenum, and stomach showed that the anastomosis was functioning and that there was bile both in the stomach and in the duodenum. The grossly nodular, bile stained liver weighed approximately 500 grams and the cut sections showed dilation of the biliary system within the liver and marked portal fibrosis.

## Pathologic diagnoses

- 1 Cirrhosis, secondary to congenital stenosis of the common hepatic duct
  - 2 Centrilobular bile stasis
  - 3 Functioning choledochojejunostomy
- 

PRIMARY MILIARY TUBERCULOSIS  
OF THE LIVER

"Primary miliary tuberculosis of the liver was found in 12 cases under conditions showing that it is not rare but is easily overlooked as a possible cause of obscure illness. The symptoms found in all these case histories included fever, lassitude, weakness, anorexia, weight loss, chills, and drenching sweats. Reaction to the Mantoux test was positive in all. No cases of jaundice were seen. Hepatomegaly, splenomegaly, ascites, alcoholism, and exposure to tuberculosis are clues to the diagnosis. Needle biopsy of the liver is valuable but need not be done immediately in very weak patients, since recognizable tubercles remain in the liver for weeks after successful therapy has started. Isoniazid and aminosalicylic acid are now given to every patient with streptomycin and steroids if necessary. The response in the cases here described was remarkably good and sometimes dramatic. All of the eight patients whose treatment was considered adequate recovered without sequelae."

—R. BARRATT TERRY, M.D.,  
ROLF M. GUNNAR, M.D.

*in Journal of the American Medical Association*  
p. 150 May 11, 1957

## SERVICE ARTICLES

# APPLICATION OF PSYCHODYNAMIC PRINCIPLES TO PSYCHOTHERAPY IN MILITARY SERVICE

HARRY TROMMAN, Lieutenant, MC USAF  
I HYMAN WEILAND, Lieutenant Colonel, MC USAF

**N**OTWITHSTANDING the recent emphasis on pharmacologic agents, psychotherapy remains the most important and essential tool for the psychiatrist. All forms of psychotherapy during the past half century have been markedly influenced by psychoanalytic principles. Even when the orthodox psychoanalytic approach is not indicated as in the military service, psychodynamic treatment techniques can still play a vital role.

There are characteristics of the military services that prohibit a thoroughgoing psychoanalytic approach and it is unnecessary for the psychiatrist to rigidly model his treatment techniques on those of the psychoanalyst. The type of case under consideration, the intensity of the psychotherapeutic endeavor, the time available, and the degree of improvement considered adequate necessitate a more flexible approach on the part of the psychiatrist and a greater utilization of those aspects of the military situation that can be helpful to the patient.

### THE MILITARY SITUATION

Certain characteristics of the military situation actually may create difficulties for the psychiatrist, especially if he cannot consider them as social realities. It is necessary to recognize the reality of these characteristics and appreciate that adequate psychotherapy can be done within the limits they impose.

By its very nature the totality of the military is somewhat inflexible, since the service must function as a highly integrated activity with purposes somewhat at variance with the alleviation of problems of neurotically vulnerable individuals. For this reason the adherence to regulations and a tightly knit disciplinary organization, though at times frustrating for the psychoanalytically oriented psychotherapist, are realistically appropriate.

---

For the Naval Medical Staff, Dr. Harry Tromman is the Department of Psychiatry, University of Chicago. Dr. I. Hyman Weiland is the Commander, The Eisenhower Institute, Philadelphia, Pa.

Although psychotherapists have found that their work proceeds most effectively when the therapeutic relationship is colored by a permissive atmosphere, this is offset by the necessity for obedience that is present in the total military situation. Insofar as the psychiatrist must also function in an administrative capacity, the treatment he gives is often handicapped by this secondary role. On the one hand, with regard to those patients who have motivational problems regarding their adjustment to the service, he must make dispositional decisions regarding separation of patients from the service, on the other hand, he must treat patients who frequently distort his function as administrator or physician. Thus, the psychiatrist undergoes a certain confusion regarding which function is primary. Frequently, a poorly motivated patient will exploit the psychiatrist's double function in order to resist psychiatric treatment, and will orient himself primarily in terms of a discharge from the service.

Certain more selective aspects of military life may increase the psychiatrist's difficulty in treatment. His time is often limited, and he or his patients are subject to practical necessities of military life that may interfere with the duration of treatment or its regular performance. The psychiatrist or his patients frequently are transient, so that neither may have the secure knowledge that treatment can proceed over a prolonged period of time without interference.

These considerations often may affect the psychiatrist in an adverse manner when he considers the possibility of performing adequate psychotherapy. He may not consider the positive aspects of military life that serve as a stimulant toward improvement in the patient and can be utilized by the psychiatrist advantageously during the course of treatment.

#### ADVANTAGES OF THE MILITARY SERVICE FOR THE PSYCHOANALYTICALLY ORIENTED THERAPIST

Of great importance to the psychiatric patient is the opportunity afforded to participate in a markedly cohesive group. He frequently has an opportunity for identifying himself with values and activities that are concrete, well formalized, and ego supportive. The group is conducive to dependency gratification and is characterized by a mutual appreciation for common problems. For the patient who has difficulty in the area of ego control, the group provides a clear cut understanding of what is positively and negatively sanctioned. It frequently is observed that the group can tolerate a psychologic disturbance in one of its members in a most understanding manner. There is little social stigmatization with such a disability, and there is a sympathetic awareness that men may react with neurotic symptomatology under stress. The group provides an opportunity for the temperate



alleviation of many of the stresses associated with individual responsibility

During the course of psychotherapy, it often is necessary for the patient to reexperience feelings and emotions that were characteristic of his relationships with his parents in early childhood. The reestablishment of these parental relationships is often facilitated simply by the hierarchical structure of the military situation. It is more possible for the patient to transfer some of these childhood emotions toward figures who, because of their rank, have already attained for him a role of father or brother surrogate.

Generally, the psychiatrist prefers to interfere as little as possible with the realities in a patient's life. Occasionally, however, one does meet the patient for whom it is desirable to effect some environmental manipulation. The presence of organization, the readiness with which this organization lends itself to pliability, and the assurance of proper liaison between line and medical officers, can be utilized therapeutically. For the patient who has difficulty in controlling acting out and aggressive outbursts, the presence of well-defined limits as to what is appropriate and will be tolerated serves as a stimulant to the development of internal control, so that in time he can mature sufficiently to decide for himself when an antisocial and unacceptable impulse must be regulated.

A constant hazard in civilian psychotherapy is the danger that the patient will relate to the psychiatrist in a destructive dependent, nontherapeutic, clinging relationship. In the military service, the emphasis on rapid improvement and the lack of opportunity for time-consuming therapeutic relationships often obviate the development of this difficulty. Every civilian psychotherapist has had experience at some time in his career with difficulties in treatment when relatives have frequent access to the psychotherapist and influence the patient in some manner that will increase his resistance to continuing the treatment. Frequently, the geographic distance from home and the sharp differentiation between civilian and military life free the patient and the psychiatrist from this additional burden.

#### PSYCHODYNAMIC PRINCIPLES

By and large, orthodox psychoanalytic treatment techniques cannot be utilized in the service. These techniques are time-consuming, expensive, and frequently not indicated in terms of the patient's disability. Psychoanalysis is a model procedure that represents an end point along a continuum on which similar, but attenuated, techniques can be utilized. In the military service it is possible to use these attenuated techniques in such a manner as to derive the most benefit in achieving psychotherapeutic aims.

In a therapeutic setting, it has proved to be most helpful to divorce the administrative and the therapeutic functions of the psychiatrist. The patient is handled administratively by his ward medical officer, and treatment is carried out in regular interview sessions with the psychiatrist, who is not involved in such matters as granting liberty, deciding on a final disposition of the patient, and instituting disciplinary action when indicated. The following case will serve as an illustration.

**Case 1.** A 22 year old sergeant with 3 years of active duty was admitted to the hospital because of an anxiety reaction that had been present for about a year. At the time of admission the patient was convinced that his symptoms were the result of stresses to which he had been exposed while on active duty. His initial motivation was to be separated from the service. Following his admission work up, he was assigned to a psychiatrist who was not his ward medical officer and was told that this psychiatrist would treat him but would take no responsibility for the final disposition regarding his returning to duty or separation from the service. Initially the patient attempted to manipulate the psychiatrist into a more active role and tried to resist treatment by bringing up dispositional matters. The patient was advised to discuss these with his ward medical officer. After the patient began to face his problems, his symptoms improved. At the end of a three-month period of hospitalization and treatment, he was interviewed by his ward medical officer who recommended that he be returned to full duty.

In the service, the need for establishment of a sense of direction and a sense of identity can be facilitated by meaningful situations and thus exploiting to best advantage the patient's capabilities, as case 2 illustrates.

**Case 2.** A 19-year old private, first class with 1½ years of active duty was admitted to the hospital complaining of masochistic tendencies and depressive feelings of several years duration. Prior to admission to the service, the patient had been active in high school sports where he satisfied certain exhibitionistic tendencies and leadership needs by taking part in dramas and athletics. After a short period of hospitalization, it was determined that he had difficulties considering himself to be a part of the group. He could doubtless function in a better capacity and overcome his symptoms if his leadership capacities were more fully utilized. The liaison officer suggested transferring the patient to the military police. This was done and he "found himself" responding very well to his new assignment. His aggressive impulses were utilized in socially acceptable channels and he no longer had to turn them in a reflexive masochistic fashion.

It has been desirable, after a sufficient period of psychotherapy and hospitalization, to recommend that the patient be returned to limited duty status, treatment being continued during the period of limited duty. This avenue of approach can be utilized for three

patients who require a period of "weaning" toward the end of treatment rather than abrupt termination. Case 3 is an example.

**Case 3.** A 47-year-old lieutenant developed a neurotic depressive reaction following a divorce three years prior to admission to the hospital. Initially, the patient related himself to the therapist in a markedly dependent regressive manner. As he was encouraged in this dependent relationship, the patient overcame feelings of depression and a limited duty assignment was recommended. During the course of the patient's return to limited duty, his progress was followed in weekly interviews, and he managed to attain a more independent and self-assertive status without again becoming depressed.

In psychodynamic therapy, it frequently is possible to effect a major personality change in a patient without producing insight, if the relationship with the therapist is sufficiently corrective and emotionally meaningful. This can be done with the patient for whom the heightened authoritarian aspect of the doctor-patient relationship recapitulates his relationship with his father, so that the patient reacts to the therapist in a manner that closely resembles his early childhood reaction. In such a situation, the therapist must then assume a role which reveals to the patient his neurotic reactions and their inappropriateness.

**Case 4.** A 27-year-old lieutenant (junior grade) with 2½ years service was admitted to the hospital with an acute anxiety reaction. Though a capable and efficient officer aboard his ship, the patient frequently felt the need of a strong authoritarian figure upon whom he could depend. His admission was precipitated by the departure of a friend several years older, whom the patient had frequently consulted for advice and support. During the initial phase of treatment, the patient utilized the difference in military rank to permit himself to relate to the therapist much like a helpless child. The therapist, however, made few comments to the patient, asked few questions, and gave no advice. The patient became increasingly disturbed by this behavior of the therapist until it was pointed out to him that he had sufficient maturity not to need this kind of support. In time, the patient saw how this characteristic had determined so many past relationships and began to experiment at being more self-assertive and aggressive. These endeavors were encouraged by the therapist, and the patient soon overcame his more dependent anxiety provoking feelings.

#### SUMMARY

Psychotherapy as a treatment procedure is of great importance to the military psychiatrist. The military service provides several advantages for the psychoanalytically oriented psychiatrist that are of aid to him in doing efficient and useful psychotherapy. It is the application of modified, flexible psychodynamic techniques in the realistic social setting of the military service that produces significant results in treatment.

# DENTAL INCIDENT RATE IN PARACHUTING

ROBERT I. SIEBER, Lieutenant Colonel DC USAF

ROBERT P. MOSS Major DC USA

**D**OES parachuting cause a proportionately greater number of dental accidents than any other type of military or non-military activity? Should a man who wears a removable prosthetic appliance, either full or partial, remove it from his mouth while engaging in parachute activities, or retain it in place? Over the past 15 years, these two questions have arisen in connection with parachute activities and dental needs. To our knowledge, no specific studies of these questions have been made and no definite conclusions have been reached. All reports up to this time have been based on isolated experiences and pure speculation.

## PROCEDURE

A record sheet was prepared (fig. 1) and distributed to the three dental clinics servicing airborne troops at this station. Examining personnel were instructed in its use and requested to complete a form for each patient who reported to the clinic with a complaint of dental injury or denture loss sustained during airborne training or actual parachuting. Any peculiar or unusual circumstances related to the event were to be described. The survey was carried on for a period of 18 months in order to obtain adequate coverage and significant data.

## RESULTS

During the survey period, 178,672 parachute jumps were performed and 10,069 airborne trainees were graduated from the basic airborne course. In these months not one case of "high altitude pain" was reported, but the injuries and dental losses shown in table 1 occurred while performing parachute jumps. During basic airborne ground training, there were two instances of partial dentures being broken.

## COMPARISON

A total of 48 fractures (either maxillary or mandibular) were treated at this station during the period covered. Only one of

---

From Division Area Dental Clinic and Office of the Dental Surgeon, 82d Airborne Division, Fort Bragg, N. C. Maj. Moss is now at Army Medical Service School, Brooke Army Medical Center, Fort Sam Houston, Tex.

In an effort to determine the frequency extent and type of dental accidents arising from airborne activities your cooperation is requested in filling out the following on all airborne personnel presenting themselves for dental treatment following such accidents or injuries

1 NAME

2 ASN

3 ORG

4 AGE

5 JUMPS COMPLETED AT TIME OF ACCIDENT

CHECK AS APPLICABLE

Type of accident or injury	Training (All airborne activities not including actual flight)	Actual Jumping (All activities including loading jumping and landing)
Lost denture		
Full	( )	( )
Partial	( )	( )
Broken denture		
Full	( )	( )
Partial	( )	( )
Fractured natural teeth (List number of teeth involved including sheared cusps)		
Fractures		
1) Mandible		
Body	( )	( )
Ramus	( )	( )
Condyle	( )	( )
2) Maxilla	( )	( )
3) Zygoma	( )	( )
Soft tissue injury		
Make Give details		

Figure 1

these was a direct result of parachuting. The remainder were caused by blows, falls, automobile accidents, et cetera, all having no relation to parachute activities.

During this same period 1,415 broken dentures were repaired at this station. Only five of these were broken as a result of parachuting or ground training for parachuting.

No comparison figures are available for the total number of lost dentures, fractured natural teeth or soft tissue injuries from all causes during the survey period, but we believe that

in these items also, parachuting contributed only a minor percentage of the total

TABLE 1. *Injuries and dental losses incident to 178 67<sup>th</sup> parachute jumps*

Accident		Previous jumps performed
Type	Number	
Denture lost	8 (4 full 4 partial)	1* 12 C 70, 17 5 31, 12
Broken	3 (2 full 1 partial)	90 8 20
Natural tooth broken	3	1 6, 6
Mandible fractured	1	12
Soft tissue injury	3*	117, 13 2

1 due to biting tongue 2 due to equipment webbing which forced soft tissue against teeth

### CONCLUSIONS

Aerodontia is not a primary factor in dental service for air borne personnel

The rate and extent of dental injuries and oral embarrassment due to parachute duty is extremely slight and of no particular significance in relation to the nature of the hazardous duty performed, and there does not appear to be any correlation between an individual's experience (number of jumps previously completed) and his susceptibility to a dental accident. The fact that all three of the cases of fractured natural teeth occurred after the sixth jump of the individuals concerned is probably coincidental.

The dental accident rate was approximately 0.01 percent of the completed jumps. Inasmuch as about 8 percent of the air borne troops at this station have some type of prosthetic appliance, it is recommended that these appliances be retained in place, if only to aid in supporting the soft and hard dental structures.

Based on this study, no special consideration appears to be warranted from the dental standpoint for personnel on airborne status other than routine dental care.

## CASE REPORTS

### Decompression Sickness at Medium Altitude

STUART A SCHNECK *Captain USAF (MC)*

**W**HILE all flight surgeons are familiar with decompression sickness or dysbarism many military physicians in other specialties or in general medicine are unaware of the symptoms and signs of this condition. Moreover few of these physicians realize the inherent seriousness of a pathologic situation in which the patient initially may present rather mild symptoms followed by collapse or death.<sup>1</sup> This report concerns the occurrence of a moderately severe case of dysbarism with central nervous system involvement first attended by a physician who was not a flight surgeon. This situation could occur to any medical officer particularly at an Air Force base and demands more than casual handling.<sup>1</sup>

#### CASE REPORT

The patient aged 30 a test pilot for a maintenance squadron at a flying training Air Force base with over 900 hours of jet aircraft flying time had no previous history of any manifestations of dysbarism. The night before the flight to be described he had four drinks of bourbon whisky the last one approximately 13 hours prior to the development of his symptoms. He had 5½ hours of sleep and an adequate breakfast before the flight. No symptoms of fatigue or physical stress were noted prior to flying.

On 25 November 1956 the patient departed Portland Municipal Airport Portland Oreg. at 1330 hours in a T 33 aircraft with destination Lowry Air Force Base Colo. He occupied the rear seat inasmuch as he was receiving an instrument check from another pilot in the front seat. There was no period of preoxygenation. On takeoff and up to 5 000 feet 100 per cent oxygen was breathed and at 5 000 feet the regulator was switched to the "normal" oxygen setting (This setting gives a mixture of oxygen and ambient air in which the per cent of oxygen increases as one ascends up to an altitude of 34 000 feet at which time 100 per cent oxygen is being breathed.) About 45 minutes after takeoff the aircraft reached cruise altitude of 40 000 feet with a cabin altitude of 24 400 feet and approximately 15 minutes later (1

hour after takeoff) he noted difficulty in focusing his eyes on the instrument panel. He immediately turned his oxygen regulator to 100 percent oxygen, held his mask tighter against his face and asked the pilot in the front seat to check the cabin altimeter. The pilot stated it was still 24,400 feet.

After approximately 5 minutes on 100 percent oxygen with no noticeable improvement in his vision, the patient turned his oxygen regulator to the pressure setting 1341 (This setting usually delivers oxygen under a pressure equal to 8 inches of water.) Shortly afterward his vision did improve slightly but was not perfect. He noted difficulty in reading the full aircraft serial number which is a series of six numbers located on the instrument panel. At first he could read only one number at a time and could not even see the others. After about 15 minutes on pressure oxygen his vision improved to the extent that he could see four numbers at once. He checked this with his left and right eyes separately and then together and found that his vision was still the same.

Approximately 15 minutes after his initial symptoms, the patient very suddenly experienced a sharp pain in his left knee. Soon afterward he noted a slight pain in his right knee and spots on both thighs that "half itched and half hurt." Ten minutes later he noted the rapid development of a very severe headache over his entire head but primarily located behind his left eye. At this time he went back to 100 percent oxygen without pressure because of the discomfort of pressure breathing and the fact that there was no improvement in his condition. During the course of 35 minutes of pressure breathing his throat had become very dry and a slight cough had developed.

Descent was begun approximately 1 hour after the original visual symptoms appeared and after passing through 20,000 feet actual altitude his knee pains and itching disappeared. The patient estimates the total time at 40,000 feet actual altitude (24,400 feet cabin altitude) was 75 to 80 minutes and that he was above 30,000 feet for an additional 20 minutes.

After landing the patient reported "After departing the aircraft [1½ hours after the onset of the symptoms] I noticed that I did not have complete control of my muscles. They were slightly jerky and twitchy. I could not walk straight and was slightly dizzy. My vision was somewhat blurred. I could not speak words clearly and my voice tended to high pitch. My thinking did not seem clear and I had some difficulty in understanding words. [He later added that the other pilot frequently had to repeat statements before he could understand them.] I sat down in Base Operations for approximately 20 minutes. The only symptoms that had disappeared were the knee pains, the itching and the cough. All others were gradually getting worse. The headache grew to an almost unbearable state. I requested transportation to the hos-



pital and arrived there approximately 40 minutes after landing. I was in a deep state of depression and had a tremendous urge to cry but had no logical reason to do so.

The medical officer who first saw this patient was an orthopedic surgeon whose first impression was that he was dealing with a sinus headache or migraine. The insistence of the patient that he wanted to see the flight surgeon because he knew this was not a sinus headache made the medical officer consider dysbarism despite the fact that this was a syndrome with which he was not too familiar. He did remember a discussion of the treatment of this syndrome at a hospital staff meeting and placed the patient at rest on 8 liters of oxygen per minute for 15 minutes. A flight surgeon was called and he examined the patient at 1900 hours. An hour later a second flight surgeon examined the patient.

His blood pressure was 110/70 mm Hg, pulse 70 per minute and regular, temperature 97.4°F, respiration 16 per min, weight 140 pounds and height 5 feet 5 inches. The fundi were normal. There was no nystagmus, pupillary reflexes and extraocular movements were normal. A gross confrontation test revealed intact visual fields and the patient's vision subjectively was no longer blurred. The neurologic examination revealed only slight weakness of the right hand. The Romberg test was negative. General physical examination findings were normal. The patient stated that he still did not feel quite right and still had a sensation of staggering when walking. He was definitely unsteady when his walking was observed.

The patient had received a total of 8 Cafertog (brand of ergotamine with caffeine) tablets in a 1 hour period before the first flight surgeon saw him. He had been nauseated before admission and at 2200 hours he vomited once. Definite improvement was then noted in his symptoms. The headache began to subside about 4 hours after admission. He was given 100 mg of Nembutal (brand of pentobarbital sodium) and slept fitfully during the night. Vital signs remained normal.

In the morning the patient had only a slight headache and a subjective feeling of general weakness. Weakness of the right hand was no longer apparent and no staggering on walking was noted or felt. Vision was 20/20 bilaterally for near and distant and depth perception, accommodation, phorias and point of convergence were all normal. Recheck of his fundi was negative. Pupillary reflexes, tangent screen and perimetry were normal as were the general physical and neurologic examination findings. Test for carbon monoxide drawn on admission was negative. Laboratory studies performed the night of admission revealed a negative urinalysis. The hemoglobin was 15.7 grams per 100 ml. The white blood cell count was 8,400 per  $\mu$ l with 56 per cent neutrophils, 40 per cent lymphocytes, 1 per cent eosinophils and 5 per cent basophils. The hematocrit was 43 per 100 ml and the sedimentation

rate was 3 mm per hour. A roentgenogram of the chest was normal. The patient stated that a vague headache and a feeling of giddiness persisted all day.

On 27 November the patient's headache was gone and he felt fine. Electroencephalographic findings were reported as normal. A neurologic examination revealed no abnormalities. On 29 November the patient again felt fine and he was released to full flying duty. He has since flown in the same aircraft to altitudes of 40,000 feet without any difficulties.

Final diagnosis was decompression sickness manifested by central nervous system involvement "bends" and parosmia.

### COMMENT

There are many reports in the literature of cases of disbarism occurring above 30,000 feet.<sup>1,2,3,4</sup> The lowest previously recorded case of decompression sickness with central nervous system involvement occurred in 1914.<sup>5</sup> The individual concerned had been at 26,000 feet cabin altitude for 1 hour and 10 minutes, and then the aircraft climbed in about 4 minutes to a cabin altitude of 29,000 feet. He collapsed and died 5 hours and 21 minutes after the onset of symptoms.

Downey in discussing this case mentioned another occurring at a cabin altitude of 26,000 feet,<sup>6</sup> and in a personal communication referred to an unreported case occurring at 29,000 feet in 1953. Sproull<sup>7</sup> reported a fatal case of decompression sickness in the Royal Air Force which occurred 19 hours after a 1 hour flight between 25,000 and 30,000 feet.

While decompression sickness with central nervous system involvement is unusual below 30,000 feet, bends, which is another manifestation of decompression sickness, has been known for a long time to occur below this altitude. There is a recent report of bends affecting an officer in a B-52 aircraft at a cabin altitude of only 23,000 feet.<sup>8</sup> Strenuous exercise can induce bends at altitudes as low as 22,000 feet.<sup>9</sup> It appears, however, that this may be the first case of disbarism with central nervous system involvement reported to have occurred below 26,000 feet.

To verify the reported cabin altitude of 24,400 feet the pilot in the front seat, who was totally free of symptoms during the flight, was questioned. He reported that he checked the cabin altimeter several times during the flight and was positive that it never exceeded 25,000 feet. The cabin altimeter was placed in a vacuum chamber and checked with a mercury barometer. At 10,000 feet the altimeter was 100 feet in error and there was no other error in the instrument between sea level and 45,000 feet.

The aircraft concerned was flown at 40 000 feet actual altitude for 30 minutes and at no time did the cabin altimeter exceed 25 000 feet The lowest cabin altitude noted at 40 000 feet was 24 500 feet The aircraft's oxygen and pressurization systems were checked and no discrepancies were found The patient's mask and connections were checked by the physiological training unit at the time of his admission to the hospital and nothing amiss was found The aircraft had 450 p s i (pounds per square inch) of oxygen on takeoff and on landing 225 p s i remained The patient who is unusually familiar with his own hypoxia symptoms checked his mask, oxygen pressure and blinker many times during the flight and throughout most of the flight held his mask firmly to his face He did this despite the fact that he always wears a very tight fitting mask

From these checks and from the progressive pattern of the patient's symptoms after he was on the ground it seems certain that hypoxia is ruled out The headache dysarthria staggering weakness of the right hand visual impairment, and difficulty in comprehension are certainly suggestive of multiple intracranial lesions presumably gas bubbles fat emboli or vasospasm While no lumbar puncture was done there were no signs indicative of meningeal irritation or papilledema to warrant consideration of intracranial hemorrhage The onset course, and recovery pattern are all consistent with the diagnosis of dysbarism

### SUMMARY

The need for a knowledge of decompression sickness on the part of military physicians has been emphasized A case of dysbarism occurring at a cabin altitude of 24 400 feet has been presented This is believed to be the lowest reported altitude for such an occurrence

### REFERENCES

- 1 Hynaker W and Davison C. Fatalities resulting from exposure to simulated high altitude in decompression chambers: a comparative study of 5 cases. *J Neurosurg & Exper Neurol* 9: 29-39 Jan 1950
- 2 Hlbouty M R and Log O R. Narrative report of case. *J Aeronaut Med* 24: 301-307 Aug 1953
- 3 Mithy report of the 101st Air Force Medical Center, Amarillo Air Force Base, Texas, Sept. 1953.
- 4 Hlbouty M R and Heisler J J. Severe neuro-ocular pathology in simulated altitude. *U S Armed Forces M J* 6: 1363-1370 Sep 1955
- 5 Behnk A. R. O. M. p. s. s. n. a. k. n. x. M. L. M. d. 117: 257-271 Sept 1955
- 6 Clin copath l g c Conf renc Dec mpt s 10 kn U S Armed Forces M J 6: 1787-1799 Dec. 1955
- 7 Sprull O H. R. port l l taly following expo to high altitude with review of path l g cal pects f dec mpt s ckn x. Royal Air Force Institute f A at n Med cin FPRC Memo 25 Apr 1951
- 8 Abstract from the crew effects on report Castl Air Force B Calif Sept. 1955
- 9 Department of the Air Force. *Flight Surgeon's Manual* AF Manual 160-5 FP 33-43 Oct 1954

## A MESSAGE FROM THE A M A

The Message last month dealt with the revision of the Principles of Medical Ethics acted upon at the 106th Annual Meeting of the American Medical Association in New York City in June 1957. Among the wide variety of other subjects acted upon by the House of Delegates were the Federal Government's Medicare Program, new standards for medical schools, a new statement on occupational health programs, and the issue of Social Security benefits for physicians.

The House considered three resolutions dealing with the Federal Government's Medicare Program for the dependents of servicemen. The delegates adopted one resolution condemning any payments under the Medicare Program "to or on behalf of any resident fellow, intern or other house officer in similar status who is participating in a training program." Government sanction of such payments, the House declared, would give impetus to the improper corporate practice of medicine by hospitals or other non-medical bodies. Such proposals, the House added, would violate traditional patterns of American medical practices, seriously aggravate problems of hospital-physician relationships, encourage charges by hospitals for residents' services to patients not under the Medicare Program, and create a variety of additional problems in such areas as medical licensure and health insurance.

In another action on Medicare, the House recommended that the decision on the type of contract and whether or not a fee schedule will be included in future contract negotiations should be left to individual state determination. In this connection, however, the House restated the A M A contention that The Dependents' Medical Care Act as enacted by Congress does not require fixed fee schedules, the establishment of such schedules would be more expensive than permitting physicians to charge their normal fees, and fixed fee schedules would ultimately disrupt the economics of medical practice. The House also suggested that the A M A attempt to have existing Medicare regulations amended to incorporate the Association's policy that the practice of anesthesiology, pathology, radiology, and physical medicine constitute the practice of medicine, and that for services by physicians in these specialties should be paid to the physicians rendering the services.

To replace the "Essentials of an Acceptable Medical School," initially approved by the House of Delegates in 1910 and most recently revised in 1951, the House adopted a new statement entitled "Function and Structure of a Modern Medical School." Presentation of the document followed a year of careful study by the Council on Medical Education and Hospitals in collaboration with the Association of American Medical Colleges.

The statement is intended to provide flexible guards which will "assist in attaining medical education of even higher standards" and "serve as general but not specific, criteria in the medical school accreditation program." The document encourages soundly conceived experimentation in medical education and it discourages excessive concern with standardization.

"No rigid curriculum can be prescribed for accomplishing the objectives of medical education," it states. "On the contrary, it is the responsibility of the faculty of each school continually to re-evaluate its curriculum and to provide in accordance with its own particular setting and in recognition of advances in science a sound and well integrated educational program."

The House also approved a new statement on the "Scope, Objectives, and Functions of Occupational Health Programs" submitted to the Board of Trustees by the Council on Industrial Health. The Board report to the House said "The statement describes and defines orthodox implant medical programs as understood in this country today and distinguishes clearly between such programs and the various plans for comprehensive medical care of the sick. It should help to resolve misunderstandings concerning the specialties of occupational medicine."

In adopting the statement, the House agreed with a Reference Committee report which declared that "The House has reported a statement which for the first time clearly defines the scope, objectives, and functions of occupational health programs. It marks the needs and boundaries of occupational health programs in the practice of medicine and it clearly charts the pathways of communication between physicians in occupational health programs and physicians in the private practice of medicine."

Two resolutions favoring compulsory inclusion of physicians in the Federal Social Security System and another one calling for a nationwide referendum of A. M. A. members on the issue were rejected by the House. The delegates reaffirmed their opposition to compulsory coverage of physicians under the Old Age and Survivors Insurance provisions of the Social Security Act. They also recommended a strongly stepped up informational program of education which will reach every member of the Association explaining the reasons underlying the position of the House of Delegates on this issue.

The House, at the same time, reaffirmed its support of the Jenkins Keogh bill. These bills, which are now pending before the House Ways and Means Committee, would, if enacted, permit self-employed persons, including physicians, to defer tax payments on amounts used to purchase private retirement annuities.

---

## DEATHS

114 Donald Lieutenant MC USN of Spring House Pa. stationed at the U S Naval Retraining Command Portsmouth N H graduated in 1954 from the University of Pennsylvania School of Medicine Philadelphia Pa. appointed a Lieutenant in the United States Naval Reserve 12 October 1956 ordered to active duty 4 October 1956 died 24 June 1957 age 28 at Exeter Hospital Exeter N H of believed acute pancreatitis

LARRABEE Wayne Fox Captain DC USA of Norfolk Nebr. stationed at the Dental Detachment U S Army Cartison Fort Bragg N C graduated in 1952 from the University of Nebraska College of Dentistry Lincoln Nebr. entered enlisted service in the Army of the United States 29 January 1943 commissioned First Lieutenant in the Medical Administrative Service 19 September 1943 while on active duty commissioned a First Lieutenant in the Dental Corps of the U S Army Reserve and ordered to active duty 16 November 1953 commissioned a First Lieutenant in the Regular Army 7 March 1955 died 19 May 1957 age 34 near South Hill Va. the result of an automobile accident

ROTH Barbara Ann Second Lieutenant ANC USAR of Cincinnati Ohio stationed at U S Army Hospital Fort Ord Calif. graduated in 1955 from the Deaconess Hospital School of Nursing Cincinnati Ohio appointed a Second Lieutenant in the United States Army Reserve 13 July 1956 ordered to active duty 10 August 1956 died 13 May 1957 age 22 at the U S Army Hospital Fort Ord of lymphatism and pneumonia

## MILITARY MEDICO DENTAL SYMPOSIUM

The First Annual Medical Department Symposium for Combined Armed Forces Medical Department Reserve Officers under the auspices of the Commandant Fifth Naval District will be held at the U S Naval Hospital Portsmouth Va 16-18 October 1957 "Advances in Operational Military Medicine" will be the theme of the three-day program

The meeting on the first day will be conducted at the U S Naval Hospital Portsmouth with a special afternoon program at the U S Naval Dental Clinic Naval Station Norfolk Va for members of the Dental Corps There will be separate meetings for members of the Nurse Corps and of the Medical Service Corps On the second day a meeting at the Fleet Training Center U S Naval Base Norfolk will be highlighted by a talk on "Advances in Medical Defense Against Thermo-nuclear Injuries" by Rear Admiral Charles F Behrens MC USN (Ret) Lectures on the third day will be given at the U S Naval Hospital Portsmouth

Among the prominent guests and speakers on the opening day will be Major General James P Cooney Deputy Surgeon General of the Army Rear Admiral Francis M Hughes Commandant Fifth Naval District Rear Admiral O B Morrison Jr District Medical Officer Fifth Naval District Captain Glenn W Berry DC USN District Dental Officer Fifth Naval District Captain Donald J O'Brien MC USNR Director Naval Reserve Division Bureau of Medicine and Surgery Department of the Navy Captain W Leona Jackson NC USN Director Nursing Division Bureau of Medicine and Surgery Department of the Navy Colonel Inez Haynes ANC Chief Nursing Division Office of the Surgeon General Department of the Army and Lieutenant Colonel Grace J Hayden USAF (NC) Command Nurse Headquarters Continental Air Command U S Air Force

Retirement point credits will be awarded to those in attendance who are on the Active Status List in the Armed Services Reserve Program provided they register with the authorized military representative assigned the duties of recording daily attendance

Programs and additional information may be obtained by addressing the District Medical Officer Fifth Naval District Naval Station Norfolk Va

## DEWITT ARMY HOSPITAL DEDICATED AT FORT BELVOIR

The second of nine new hospitals planned for the Army during the current building program was formally dedicated as DeWitt Army Hospital, named in honor of Brigadier General Wallace DeWitt MC, USA, on 26 June 1957 at Fort Belvoir, Va. This new, multistory, 250-bed hospital which can be expanded to 500 beds with the construction of two additional wings, cost approximately 4½ million dollars, excluding equipment and epitomizes the latest thinking in the design and construction of hospitals. The structure is of a contemporary style of architecture replacing a rambling series of World War II cantonment type frame buildings. It is constructed along highly functional lines, and features centralized clinics, an audiovisual call system, a central dictation network, a 46-station pneumatic tube message carrier system, and other modern innovations. Colonel Charles L. Kirkpatrick, MC USA, is the present commanding officer.

A short dedication ceremony was held in the main lobby where a portrait of the late General DeWitt and a dedicatory plaque were unveiled by General John DeWitt. The plaque reads as follows:

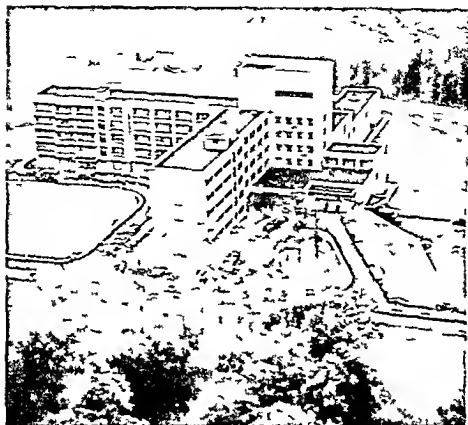
1957  
DEWITT ARMY HOSPITAL  
FORT BELVOIR VIRGINIA  
Named In Honor of  
BRIGADIER GENERAL WALLACE DEWITT  
MEDICAL CORPS UNITED STATES ARMY  
1878-1949

The main ceremony was held in a wooded area directly across from the new hospital. Major General Silas B. Hays, Surgeon General, United States Army, gave the dedication address. Speaking to a group of distinguished visitors which included members of the DeWitt family, Major General Dan C. Ogle, Surgeon General, United States Air Force, and Major General David H. Tulley, USA, Commanding General, U. S. Army Engineer Center and Fort Belvoir, General Hays paid great tribute to the officer in whose name the hospital was dedicated, saying:

We are here today to dedicate a hospital. I would be the last to say that the quality of medical service depends primarily on the quality of the physical plant in which it is housed. Primarily it depends on the professional competence and enthusiasm of the people comprising that service. On the other hand, I would not say that the physical plant has no effect on the quality of medical service. Here at Fort Belvoir you have had an excellent medical serv-



ice in spite of undesirable buildings. I have great confidence that you will have an even better medical service now that you have this wonderful new hospital on your post. I know both the patients and the staff will be happier and prouder.



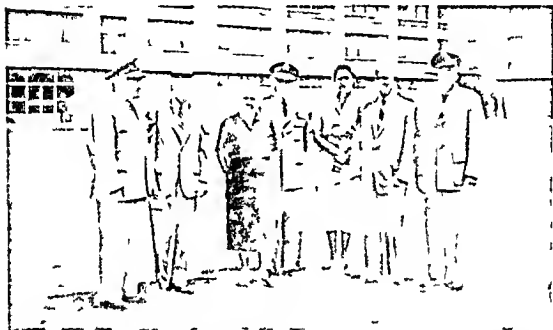
*The newly dedicated DeWitt Army Hospital, Fort Belvoir*

DeWitt Army Hospital continues a new tradition in the Army Medical Service. Heretofore we have had named hospitals and "post" or station hospitals. As our new permanent post hospitals are completed and put into operation, we plan to name each one. It is appropriate that the newest of our Army hospitals bears the name of one of the most outstanding medical officers in our Army's history, Brigadier General Wallace DeWitt. It is most proper also to note that this occasion marks the second time the Army and the Army Medical Service have saluted the name of DeWitt in this manner. In February 1944 when the Army activated a General Hospital at Auburn, Calif., it was named in honor of Brigadier General Calvin DeWitt, father of the outstanding medical officer we are here to honor today.

Throughout the history of our country, the United States Army has furnished many of our greatest public leaders. In like manner, the Army Medical Service has had the good fortune to list among its members medical men whose skills and abilities gained national recognition—to name only a few, Beaumont Letterman, Gorgas, Sternberg, Walter Reed, Kell, Craig Simmons, and Irvin. Included in any list of our illustrious Army medical men must be the medical officer in whose name we dedicate this hospital today, Brigadier General Wallace DeWitt.

It is not my intention here today to review General Wallace DeWitt's life or to list his accomplishments and the honors that were accorded him. All of these are a matter of record shining brightly on a special page of the Army Medical Service's history. I do believe it is fitting to note some of the highlights of General DeWitt's life in order that you may also come to appreciate his abilities and understand why we are naming this hospital for him.

General DeWitt was born in 1878 at Fort Steele, Wyo., the son of an Army officer. His father served the Army for 49 years as an infantry and later as a medical officer. General DeWitt received his M. D. degree from the University of Pennsylvania in 1900 and entered the Army the same year as a contract surgeon. His first assignment was in the Philippines and included action in several expeditions as well as duty on the island of Corregidor.



Reading left to right: Major General David H. Tulley, USA, Commanding General, U. S. Army Engineer Center and Fort Belvoir; General John DeWitt, USA (Ret.); Mrs. Ruth Blanchard; Major General Silas B. Hays, Surgeon General, U. S. Army; Mrs. Calvin DeWitt; Brigadier General Calvin DeWitt, USA (Ret.); and Major General Dan C. Ogle, Surgeon General, U. S. Air Force.

In World War I he was Surgeon of the 83d Division and then joined the Vth Corps as Chief Surgeon, serving in the St. Die section in the First Army Sector and participating in the Meuse-Argonne Offensive.

Returning from France in 1919 he was assigned to Fort Thomas, Ky., and Fort Sam Houston, Tex., after which he was assigned to Letterman General Hospital in San Francisco. He became professor of military hygiene and post surgeon at the United States Military Academy at West Point in 1931, remaining at that post until named head of the Walter Reed Army Medical Center in 1935. In December of that year he was appointed Brigadier General Assistant to The Surgeon General, a post he held until 1939.

He again assumed command of Letterman General Hospital in 1940. Required for age in 1942, he was immediately recalled to active duty because of our entry into World War II. He became port surgeon, San Francisco Port of Embarkation, and served with his usual distinction in that assignment until ill health caused him to retire in 1945.

Failing strength severely limited his activities following retirement and the loss of his beloved wife in the year of his retirement affected him most deeply. General DeWitt died in December 1949 at Letterman Army Hospital where he had passed many happy and successful years and he was buried in Arlington.

General DeWitt was a man who loved and who followed the highest precepts of the doctor and the soldier service to his country the healing of human ills the instruction of youth His devotion to his chosen profession of healing and his dedication to duty were the hallmarks of his noteworthy service to the Army the medical profession his country and his fellowman.



Standing before portrait of the late Brigadier General Wallace DeWitt MC USA are (left to right) Major General David H. Tulley Major General Silas B. Hays and General John DeWitt (center)

We are pleased to have with us today General DeWitt's brother General John L. DeWitt (retired) his brother Brigadier General Calvin DeWitt (retired) and his sister Mrs. Robert M. Blanchard widow of an Army officer. It is not often that we have an entire family whose life has been and is so closely related to the Army. I know that all of them treasure this moment and that the memory of this occasion will be cherished with the many other memories they have of the distinguished brother and his contributions to the nation as an Army medical officer. I know all of us are glad that so many members of this great DeWitt clan are able to be with us today and join us in honoring one of the greatest members of their illustrious family. I know all of you join with me in the wish that this occasion will provide one more proud and happy memory for all of them.

General DeWitt received countless commendations for his professional skill and administrative ability during his long career. His reputation is already secure, yet I believe this fine new building will make certain that his unquestioned brilliance is properly memorialized in our time.

Both the Army Medical Service and Fort Belvoir have reason to be proud to dedicate this hospital today to a man who gave of himself to the Army as completely and as selflessly as did General Wallace DeWitt.

---

## Legion of Merit to Three Air Force Officers

The Air Force recently awarded the Legion of Merit to Major General William H. Powell, Jr. and Colonels Marsh R. Halbouty and Robert A. Patterson USAF (MC) for exceptionally meritorious conduct in the performance of outstanding service.

General Powell, former deputy surgeon general of the Air Force and now senior medical officer at SHAPF, was cited for his "significant efforts as a military leader and physician in raising the United States Air Force Medical Service to an unprecedented level of professional competence with its resultant contribution to the operational capability of the Air Force."

Colonel Halbouty's "outstanding professional and administrative skill" were instrumental in making noteworthy contributions to the Air Force Medical Service mission while he was wing surgeon and hospital commander at Ellington Air Force Base, Tex. He is now commander of the U. S. Air Force Hospital, Itazuke Air Base, Japan.

Colonel Patterson was commander of the U. S. Air Force Hospital, Madrid, Spain, from 24 August 1954 to 27 December 1956, where he "demonstrated outstanding initiative and creative imagination in locating, equipping and maintaining a compact, modern medical facility able to provide excellent medical care for military personnel in Spain and by his professional competence, tact and extensive knowledge of medical problems, gained the assistance and cooperation of the local medical authorities." He has been reassigned to Stewart Air Force Base, New York, as surgeon of the Eastern Air Defense Force.

## SYMPOSIUM ON MILITARY MEDICAL PROBLEMS AT INTERNATIONAL COLLEGE OF SURGEONS CONGRESS

Medical problems of the Navy particularly those arising out of an atomic age will be considered in a Navy Symposium that will feature the scientific program at the 22d Annual Congress of the United States and Canadian Sections International College of Surgeons in the Palmer House Chicago Ill 8-12 September

The symposium will be presented on the morning of the final day it was announced by Vice Admiral Ross T McIntire Chicago executive director of the International College of Surgeons Admiral McIntire said that the following naval officers from Washington will participate

Captain Harry J Alvis Director of the Submarine Medicine Division Bureau of Medicine and Surgery Submarine Medicine in the Nuclear Age

Captain James A Brimsoo Head of the Atomic Defense Branch of the Special Weapons Defense Division Bureau of Medicine and Surgery Hazards of Ionizing Radiation to Military Medicine

Captain Gerald J Duffner Medical Officer of the Experiment 1 Diving Unit Naval Gun Factory Medical Aspects of Recent Trends in Diving

Captain William M Soowdeo Head of the Special Activities Branch of the Aviation Medicine Division Bureau of Medicine and Surgery Newer Concepts of Aviation Medicine

Lieutenant Commander John H Ebersole Medical Officer aboard the U S S *Seawolf* nuclear-powered submarine Problems of Radiologic Safety Associated with Seagoing Nuclear Reactors

The scientific program of the congress will cover all phases of surgery The speakers will include world renowned surgeons from four other continents as well as from the United States Canada and Mexico

# ANNUAL MEETING OF MILITARY SURGEONS IN WASHINGTON, D C , OCTOBER 28 30

"Professional Excellence—The Criterion of Military Medicine" will be the theme of the 64th annual convention of the Association of Military Surgeons of the United States, which will be held at the Statler Hotel, Washington, D C , on October 28 to 30 1957. In addition to the program listed below, meetings of the dental, nurses, veterinary, medical specialist, and sustaining membership sections will be held.

## Monday Morning, 28 October

*Presidential Address*—Col Amos R Koontz, MC Maryland National Guard

*Panel Meeting—Medical Education in the Federal Services*

The Surgeons General Army Navy Air Force and Public Health Service  
and Medical Director Veterans Administration

Moderator Dr Frank B Berry Assistant Secretary of Defense (Health  
and Medical)

## Monday Afternoon

Presiding Col Joseph R Shaeffer MC USA Consultant on Medical Care  
in Disaster Walter Reed Army Institute of Research Wash-  
ington, D C

Theme Disaster Medicine

*Quo Animo*—Maj Gen Isidor S Pavlin MC USAF (Ret.) John Rhea Barton  
Professor of Surgery University of Pennsylvania Philadelphia Pa

*Disaster Management—Part II*—John M Whitney M D USPHS Deputy Direc-  
tor United States Public Health Service Dallas Tex Former Medical  
Director Federal Civil Defense Administration

*The Role of Blood in Disaster*—Col Douglas B Kendrick MC USA Chief  
Surgical Consultant Office of the Surgeon General U S Army, Washington  
D C

*Newer Medical Training Objectives in USAREUR*—Maj Gen Alvin L Gorby  
MC USA The Surgeon United States Army Europe

*The Influence of Whole Body Irradiation on Recovery*—Lt Col James B  
Hatterging MC USA Director Division of Physiology and Pharmacology  
Walter Reed Army Institute of Research Washington D C

*Operation Fire Drill—U S A*—Maj Gen William Shambora MC USA Com-  
manding General Brooke Army Medical Center Fort Sam Houston Tex

*A Mutual Assistance Plan for Disaster Management*—Brig Gen Harold  
Twitchell USAF (MC) The Surgeon Continental Air Command Mitchel  
Air Force Base N Y

*Quo Vadis*—Rear Adm Winchell Mack Craig MC USNR (Ret) Professor of Neurosurgery Mayo Foundation University of Minnesota Rochester Minn

### Tuesday Morning 29 October

Subject to be announced—Dr Paul M A Lanebarger Professor of Oriental Politics School of Advanced International Studies The Johns Hopkins University Baltimore Md

*Government and Industry Today*—Mr John Connor President Merck & Co Inc Rahway N J

### Tuesday Afternoon

*Surgery of the Large Intestine*—Panel Calvin Smyth MD Philadelphia Pa (Chairman) Henry W Cace MD New York N Y and Harvey B Stone MD Baltimore Md

### Wednesday Morning 30 October

*Management of Patients With Coronary Artery Disease*—A Joint Medical and Surgical Panel

*Medical Aspect*—Wilbur D Stroud MD Philadelphia Pa (Chairman) George E Burch MD New Orleans La and Thomas W Mattingly Col MC USA Washington DC

*Surgical Aspect*—Alfred Blalock MD Baltimore Md (Chairman) Claude S Beck MD Cleveland Ohio and James Forsee Brig Gen MC USA Washington DC

### Wednesday Afternoon

*Hospital Management—Panel Meeting*—Russell A Nelson MD (Chairman) Director The Johns Hopkins Hospital Baltimore Md

Others to be announced

# OFFICERS CERTIFIED BY SPECIALTY BOARDS

## Supplementary Listing

According to information from the Offices of the Surgeons General of the military medical services, the following regular Medical, Dental, and Veterinary Corps officers have been certified by the boards indicated since the listings published in previous issues of this *Journal*

### American Board of Pediatrics

Enrico D Carrasco Lt Col USA	Sigmund Schwarzer Capt USAF
John W George Maj USAF	

### American Board of Psychiatry and Neurology

#### Psychiatry

Murray F Finn Maj USA	Henry A Silberman Maj USA
-----------------------	---------------------------

#### Neurology

Harold Collings Jr Maj USA

### American Board of Orthopaedic Surgery

Ben A Rutledge Lt Col USA	Keith A Walker Lt Col USA
---------------------------	---------------------------

### American Board of Dermatology and Syphilology

Michael J Davis Maj USA	John E Reiser Maj USA
-------------------------	-----------------------

### American Board of Radiology

James T Brennan Lt Col USA	Charles Onstead Capt USA
William C Finlay Capt USAF	

### American Board of Urology

Charles A Moore Maj USA	Kyder E Van Buskirk Lt Col USA
Edward J O'Shaughnessy Maj USA	

### American Board of Obstetrics and Gynecology

James H Lee Jr Comdr USN	Oscar J Rosenzweig Maj USAF
--------------------------	-----------------------------

### American Board of Internal Medicine

Glen K Arney Maj USA	Per H Langsjoen Maj USA
Robert Bernstein Lt Col USA	Wendell F Lienhard Jr Maj USA
Gordon W Briggs Maj USA	Frank L Miller Lt Col USA
Ray G Cowley Lt Col USA	James R Mincks Capt USA
Robert W Green Maj USA	Nicolas H Nauert Jr Lt Col USAF
George B Hamilton Maj USA	Joel E Reed Maj USAF
Euclid G Herndon Jr Lt Col USA	William R Schillhammer Jr Maj USA
Harry F Hurd Maj USA	Edwin S Stenberg Jr Lt Col USA
Robert T Jensen Lt Col USA	



**American Board of Pathology**

Cl ud W D I M J USA

John M Luk man Lt Col USA

**American Board of Ophthalmology**

Mel t L Gumm Maj USA

Fred C. Williams M J USA

**American Board of Surgery**

Dast I C. Campbell Jt Lt Col USAF

Philip J No l Jt Lt Col USA

Carl W Hughe Lt Col USA

John W White Lt Col USA

William M. F flag M J USA

**American Board of Anesthesiology**

J hn A J icek Lt Col USA

**American Board of Preventive Medicine****Aviation Medicine**

Al nzo M Donn ll J M J USAF

D id H Beyer Maj USAF

**American Board of Oral Surgery**

D id J Ell Lt Col USA

Henry C. Thompson III Lt Col USA

J hn E. Pl sa ts Lt Col USA

**American Board of Orthodontics**

George H Parr t Jr Lt Col USA

**American Board of Prosthodontics**

R ymond H Osterh litz M J USA

**American Board of Veterinary Public Health**

Don ld C Kelly Lt Col USA

Lesli C. Murphy Lt Col USA

## Reviews of Recent Books

**THE TREATMENT OF BURNS** by *Curtis P. Artz* M D F A C S Lt Col MC USA (Ret), and *Fritz Retts* M D 250 pages 199 illustrations on 105 figures Illustrations by *Burr Bush* W B Saunders Co Philadelphia Pa, 1957 Price \$7.50.

This short concise but extremely informative text covering particularly the detailed management of burns is a highly welcomed volume to the medical literature. The vast experience and authoritative knowledge of the authors plus the clear readable style of the text will find this volume being referred to frequently by all physicians responsible for the care of the burned patient. The organization of the material makes for rapid easy reference. The detail of information is sufficient to satisfy the most critical reader. The basic pathophysiologic concepts involved are adequately reviewed. Conflicting points of view are clearly expressed. The choice of therapeutic armamentarium is based on a well-established scientific foundation. As an example, the authors identify clearly the occlusive dressing and exposure method in the treatment of burns as distinct from and not to be confused with such terminology as open or closed management since the aim of both occlusive dressing and exposure method is similar namely, the accomplishment of a dry protective covering. Neither method is completely ideal and frequently one should complement the other. The authors are to be commended for the Herculean task of bringing together in a most acceptable form the extensive world writings on this most formidable surgical problem. This volume should find itself in the personal library of all who accept the responsibility for the treatment of burns.

—DAVID GOLD Col USAF (MC)

**PRINCIPLES OF UROLOGY** An Introductory Textbook to the Diseases of the Urogenital Tract by *Neredith F. Campbell* M S M D F A C S 622 pages 319 figures W B Saunders Co Philadelphia, Pa 1957 Price \$9.50

This book was written by Doctor Campbell who is one of the foremost urologists of our time to serve a twofold purpose for the instruction of the student in the broad fundamentals of urology and as a practical guide for the physician who is not a specialist in urology. To accomplish this the author has omitted controversial points unlikely theories, and detailed descriptions of major procedures such as are usually found in standard texts on this subject and has described in detail in a concise and easily understandable fashion all of the aspects of urology that are of value to the groups for whose use the book is intended.

The subject matter is extremely well covered and only widely accepted and up-to-date diagnostic and therapeutic procedures are presented. This book is replete with illustrations (photographic and artistic) and diagrammatic tables of the highest quality which serve further to enhance its value. Outstanding among the tables presented are those on the "Embryonic Derivations of the Urogenital Analage" in chapter 6 and "Fluid Administration" (adults and children) in chapter 7. At the end of the book Doctor Campbell has included a section on questions arranged according to chapters which gives the page reference numbers for the answers thereto. This affords an unusual and extremely desirable method for review of the subject matter particularly for examination purposes. In keeping with the rest of the book the bibliography and index are of the highest quality.

This book will be of inestimable value to physicians without specialized urologic training in the management of patients with actual or suspected urologic diseases and defects in regard to both proper diagnosis and treatment including such procedures as urethral catheterization, the passage of urethral sounds and minor surgical procedures. It is strongly recommended also for all students including those at the resident level.—MARK S. CURTIS Capt AC USN

**SYNOPSIS OF GASTROENTEROLOGY** by Rudolf Schindler M D F A C P  
395 pages illustrated Grune & Stratton Inc New York N Y 1957  
Price \$7.75

This book is a most inclusive synopsis of diseases in the field of gastroenterology for its size written without any excessive verbiage and in a most readable style. Dr. Schindler presents this book for the general practitioner as well as the specialist in internal medicine.

One of the reasons that it is a most useful book is that it is a personal summary in the practical diagnosis and treatment of gastrointestinal disorders. The author has presented us his diligent experiences of more than 35 years of practice in this field. There are no references in this book except for the general acknowledgment of five or six standard textbooks in the field of gastroenterology and associated radiology. The book is divided into 17 chapters beginning with a discussion of gastrointestinal lesions and symptoms connected with diseases of other organ systems and closing with a presentation of general therapy of gastrointestinal diseases.

In the over-all presentation of material the general etiology and symptoms of gastrointestinal disorders is discussed. The author then covers in concise form the various pathologic conditions and their treatment affecting the gastrointestinal system from the mouth to the rectum. Since Dr. Schindler has been one of the pioneers in the use of a gastroscope he states that if the clinical history is suggestive of disease of the stomach a doctor cannot say that a certain patient has no organic disease even if x ray and other studies are absolutely negative unless he also has done a gastroscopic examination. He admits of course that even a gastroscope has its limitations but it does supple-

ment the radiologicalexamination of the stomach. He also maintains that when gastrointestinal disease is suspected that in addition to a detailed history and physical examination the other studies must include fluoroscopy of the esophagus and x-ray of the entire gastrointestinal tract including a barium enema and a gallbladder series. D. Schindler may be overemphasizing laboratory and x-ray procedures but in the individual patient all these procedures must be considered if the patient's symptoms suggest disease. He emphasizes the importance of a detailed carefully performed physical examination, and comments that even though a patient may seem to have no organic disease he should not be told that there is "nothing wrong with him" but should be told that "no disease has been found as a result of all these thorough examinations and tests."

This synopsis of gastroenterology is an up-to-date book, and carefully compiled as a practical reference volume for the hospital resident as well as the internist and general practitioner. Other volumes would have to be consulted for theoretical concepts and discussion of controversial aspects of gastroenterology. This book is highly recommended for any hospital or private professional library.

—U. R. WHITKASAS Col MC USA

**CLINICAL ELECTROCARDIOGRAPHY** *Interpretation on a Physiologic Basis*, by Samuel Gardberg M.D. with Chapters by Richard Ashman Ph.D., Irving L. Rosen M.D. and Louis Levy II, M.D. 315 pages illustrated. Paul B. Hoeber Inc. Medical Book Department of Harper and Brothers New York N. Y., 1957. Price \$12.75.

The stated purpose of this 315 page profusely and well illustrated text is to present the physiologic principles upon which electrocardiography is based and to demonstrate by visual means the electrocardiographic alterations that are produced by physiologic as well as pathologic variations. The author and the contributors to this text have succeeded in accomplishing this goal. The conventional standard limb leads and unipolar limb leads are illustrated as a projection of the derived spatial QRS loop and the precordial leads by the solid angle method. A simple means of utilizing a model spatial QRS loop projected upon the frontal plane is used as an effective teaching aid. The major value of this book is the clear presentation by these means of the changes of the QRS and T deflections that result from normal variations particularly those of cardiac position. Adding greatly to its worth is the contribution of Richard Ashman who presents a clear and concise discussion of the mechanisms of A-V conduction disturbances and the arrhythmias.

It is unfortunate that the established clinical value of the precordial leads is minimized by the author. The use of multiple precordial leads is not adequately discussed and the value of exploratory leads ignored. An almost total reliance on the use of the limb leads by construction of a frontal plane QRS-T loop is the major defect in this otherwise excellent presentation. Another deficiency is that interpretation of P wave variations is neglected. Issue might also be taken with the

interpretation given to ST T wave variations although the author admits that proper evaluation usually depends upon the experience of the observer

In summary this book should not be considered a reference text for all the problems encountered in electrocardiographic interpretation. Rather its value lies in the clear method of presentation of the basic concepts which will properly orient the beginner emphasizing the hazards of empiricism to those more experienced while to the teacher it offers a method whereby the physiologic principles of electrocardiography may be effectively presented

—LOREN F PARNLEY Lt Col MC USA

MODERN TRENDS IN GERIATRICS edited by William Hobson B Sc M D D P H 422 pages illustrated Paul B Hoeber Inc, Medical Book Dept of Harper & Bros New York N Y 1957 Price \$13.50

This British publication composed of 17 chapters on carefully chosen topics is a fairly comprehensive review of gerontology with an adequate bibliography for each subject. The first chapter gives one a good perspective as to the current and anticipated impact of aging as shown by the estimate that 20 per cent of the British population will be eligible for pension by 1980 (similar to the trend in the United States). This is followed by objective evaluation of aging by biologic biochemical and psychologic measurements. The specific and detailed discussions of the basic diseases of the aged are interesting. The term *chronic bronchitis* appears to be similar to what is called *pulmonary emphysema* in the United States.

This text adequately summarizes the positive approach and optimism one must acquire in the total care and rehabilitation of the aged. It should be of particular value and interest to internists, general practitioners and social service workers both in Britain and in the United States — JOHN B MacGREGOR Capt MC USN

ATLAS OF CLINICAL ENDOCRINOLOGY including Text of Diagnosis and Treatment by H Lissner A B M D and Roberto F Escamilla A B M D 476 pages 148 plates including 3 in color The C V Mo by Co St Louis Mo 1957 Price \$18.75

As the authors state there are many excellent textbooks of endocrinology well illustrated but still presenting the subject primarily by the written word. Intending this to be an atlas of practical endocrinology for clinicians the authors use the welcome pictorial approach. Drawing mainly from their extensive source of patients at the University of California School of Medicine clinics and supplementing it where necessary with sketches or loaned photographs they present an amazingly complete coverage of the endocrinopathies in less than 500 pages.

The typical case photographs taken serially when progression or response to treatment is pertinent make an indelible imprint on the reader's memory coming as close to bedside rounds as literature can. Concise case histories add to the vivid portraits so that any observant

clinician not particularly schooled in endocrinology, should be guided to proper diagnosis. To complete the subject coverage laboratory findings and charts of endocrine development norms are included, but the emphasis is kept clinical.

It is refreshing to have the authors present their specific recommendations as to case management rather than merely list the possible therapeutic programs, which often leave the less experienced physician in a maze of indecision. Certainly Doctor Lissac and Lissac will have every right to speak with authority, and their opinions are of infinitely more value than any compiled list of alternatives.

This beautifully presented atlas is a welcome and most heartily recommended addition to the library of every clinician and is an absolute necessity for the practicing endocrinologist. Despite the hundreds of excellent photographs, some in color, the price of the atlas is within the general range expected for good medical textbooks.

—FRANCIS G. SOULE, Jr. Capt. MC USA

**BLOOD AND BONE MARROW PATTERNS** by C. D. Talbot, M. D., Elmer R. Hunsicker, B. S., and Jonah L. M. D. 39 pages, illustrated with 145 colored photomicrographs. Crane & Stratton, Inc., New York, N. Y. 1957. Price \$12.

This book departs from the usual publications in the field of hematology in that it presents blood and bone marrow patterns along with cell morphology. The blood cell series and the cell patterns of the various disease states are included in the book.

A brief description of each cell appears on the page facing the photograph of that cell, thus linking description and cell. This eliminates searching the text in an effort to link the two, a common fault of many of such textbooks.

The photomicrographs, all in color, can only be spoken of in superlatives. They are truly outstanding. The authors are to be commended for their fine work. No other text in the field quite equals this one in this respect.

Clinical data is not included and none is necessary if the book is used as it should be—as an adjunct to a good standard textbook of hematology.

The Atlas is of value to the teacher as well as to the student. It is almost a must for the general practitioner who wishes to make a diagnosis and follow his own cases of this type. The book should be in the library of every physician who has an interest in the field of hematology.

—WILLIAM C. DUNNINGTON, Lt. Col. MC USA

**FUNDAMENTALS OF MICROBIOLOGY** by Martin Frobisher, Sc. D. 6th edition. 617 pages, illustrated. W. B. Saunders Co., Philadelphia, Pa. 1957.

This is a new edition of a reliable textbook covering the entire field of microbiology. Designed for college students who are not necessarily specializing in microbiology, the book has been written in a most

interesting and readable style and covers viruses tickettsiae and fungi as well as bacteria Physicians wishing to review the basic fundamentals of the field of microbiology especially the more recent changes will find the book an excellent one

The references at the end of each chapter are current and while many important individual references to classical papers have been left out the author has made provisions to cover this minor fault by including references to textbooks and review papers covering the earlier more classical work

The author has drawn generously from many sources an excellent collection of photographs to supplement his readable text the combination producing a very clear concise and accurate survey of microbiology This is a textbook that should find a place in the library of anyone interested in keeping up with the latest advancements in this field —DAVID F HERSEY Capt USAF (MC)

**PERINATAL LOSS IN MODERN OBSTETRICS** by Robert E L Nesbitt Jr M O A Series of Monographs in Obstetrics & Gynecology edited by Claude E Heaton M D 432 pages 108 illustrations including 10 in color F A Davis Co Philadelphia Pa 1957

Until recently perinatal mortality has not received the interest or attention of maternal mortality Drawing from his clinical and pathologic experience at Johns Hopkins University Dr Nesbitt now gives us a reference volume on perinatal loss

The first portion of the book deals with statistical analysis and classification based upon the groupings of the World Health Organization i e early fetal death intermediate and late fetal death and additionally includes a section on prematurity The second portion covers specific causes of fetal death i e anoxia birth injury malformations infections hemolytic disease multiple gestation ectopic gestation analgesia and anesthesia and factors in prevention of perinatal loss The appendix contains a perinatal mortality code sheet valuable for conference use

This new volume is a readable well illustrated thorough survey of this important subject which includes new and original work in addition to an extensive and usable bibliography It is required reading for obstetricians pediatricians and pathologists

—WILLIAM C HERNQUIST Lt Col USAF (MC)

**CLINICAL NEURO-OPHTHALMOLOGY** by Frank B Walsh M D F R C S (Ed) D Sc (W A Hon) 2d edition 1293 pages illustrated The Williams & Wilkins Co Baltimore Md 1957 Price \$29

This book is the most complete publication on the subject of neuro-ophthalmology in print today The chapters are well organized to allow the reader to quickly refer to the type of case in mind The individual diseases discussed are well outlined yet in sufficient detail to give the reader a clear concise resume of the history signs symptoms and

pathology of each condition described. The style of writing stimulates the reader's interest to follow the discussion to completion. The abundance of reference material cited at the end of each disease described gives authenticity to the statements made. The author gives full credit to previous writers in instances wherein his own experience with a particular condition is lacking.

This volume provides the experienced ophthalmologist with a ready reference to any particular type of case and at the same time affords the less experienced the opportunity to study neuro-ophthalmologic conditions as part of a group. The illustrations are numerous and have been chosen well to depict the typical conditions described. The chapter on "Tumors and Related Conditions" is considered to be one of the best presented sections of the book. The inclusion of a paragraph on treatment in many of the conditions described adds greatly to the value of this work as a reference book.

—JACK H. BRISTOW, Col. USAF (AC)

**THE YEAR BOOK OF THE EYE, EAR, NOSE AND THROAT (1956-1957 Year Book Series)** The Eye, edited by Derrick Vail, B. A., M. D., D. Oph. (Oxon.); F. A. C. S., F. R. C. S. (Hon.). The Ear, Nose and Throat, edited by John R. Lindsay, M. D. 448 pages, illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1957. Price \$7.

This outstanding edition of the Year Book series presents impartially selected condensations of the more leading and timely articles relating to the eye, ear, nose and throat from the World's journals received between October 1955 and September 1956.

Of the book's 448 pages, half are devoted to ophthalmology, which is further divided into 11 major headings. The ENT section is arranged within 14 groupings. The masterfully selected articles are of significant importance in describing and explaining the newer diagnostic and therapeutic approaches to the problems of eye, ear, nose, and throat.

Both the eye and ENT sections are replete with excellent diagrams, charts, and illustrations. The editorial supplements reflect the vast experience and status of the commentators, adding to the interest and interpretation of the articles.

The printed slip of 23 questions on the articles in the book should be made a permanent page at the end of the volume. The index, both by subject and author, is of value in using the book as a reference. The volume is a must for every physician interested in ophthalmology and otolaryngology. Inasmuch as these specialties must be considered mature and independent, many interested physicians will be glad to note the replacement of the 1957-1958 series of the Year Book of Eye, Ear, Nose & Throat by two volumes, one, *The Year Book of Ophthalmology* and the other *The Year Book of Ear, Nose and Throat* (including a section of maxillofacial surgery).

—LE ROY E. WIBLE, Capt. MC, USN



MODERN OPERATIVE SURGERY in Two Volumes Volume II edited by the late G Gey Turner LL D D Ch M S F R C S F R A C S and Lambert Charles Rogers V R D M Sc M S F R C S F R C S E F R A C S F A C S with a foreword by Sir Gordon Gordon Taylor K B E C B M A LL D Sc D M D M S F R C S F R C S E F R C S I F R A C S F A C S 4th edition 2 614 pages illustrated Paul B Hoeber Inc New York N Y 1957 Price \$17 50

This work of 38 contributors from the British Empire covers the whole field of operative surgery and the surgical specialties The virtue of having basic information concerning every facet of the field of operative surgery is offset by the fact that in many details obsolescence has already set in before the reader gets the book The bulk of the book is standard material that has permanent value The tremendous amount of work that went into preparing this work is partially wasted because it has lost the freshness and newness that would make possession of the set a delight to the owner

Examples of the outdated of some material are Diphtheria offers the widest sphere of usefulness (for tracheotomy) The dressing (for laryngectomy) should be just tight enough to give a slight cyanosis of the lips and the ears "Herniotomies are kept in bed for 21 days postoperatively Use catgut in tying off omentum because omentitis sometimes follows the use of silk In the section on Rectum and Anus it is stated that 12 percent of the fistulas in ano are tuberculous Colon preparations are of streptomycin and a sulfa drug and newer preparations are not mentioned These are typical examples of differences from common practices and experiences in this country Certain practices of British physicians are noted by innuendo such as that of otologists to do the surgery on otogenic brain abscesses is an example Another is the specific comment that in excision of an eye everyone wears rubber gloves

The most interesting and helpful parts of this work are in the philosophies expressed as in excerpts from Gordon Grey Turner's introduction The measure of surgical skill is efficiency The correct operation clumsily performed is much more likely to be successful than the wrong operation no matter how brilliantly performed In discussing the operability of certain malignant lesions he quotes

The abyss is worth a leap however wide  
When life sweet life is on the other side

The book is mechanically well done it is well indexed anatomic descriptions are uniformly excellent and lucid and footnotes give bibliographic references and occasional editorial annotations The references are usually hallowed with age The print is of a size to permit the mature surgeon to read it with ease The quantity of material the extremely wide but somewhat outdated coverage of a vast subject the detail expressed and the cost however make it probable that most busy surgeons or students will not take the time to read nor assume the expense to own this work —DON S WENGER Col USAF (MC)

**SURGERY: Principles and Practice** by J. Carroll Allen, M. D., Henry A. Harkins, M. D., Ph. D., Carl A. Weaver, M. D., and Jonathan E. Heflat, M. D., D. SC. (Med.) with 32 contributors. 1495 pages, 673 illustrations. J. B. Lippincott Co., Philadelphia, Pa., 1957. Price \$16.

The most severe criticism that could be made of this weighty tome (8 pounds, 1495 pages) is that perhaps it attempts to do too much for too many. Possibly it should be divided into two or more volumes for ease of reading and for its value to the student for the principle of surgery and its value to the surgeon in the practice of surgery, although it often is difficult to draw the line between the principles and the practice. The book is written in clear, concise, grammatical English (which is not found too frequently) and the illustrations for the most part are really explanatory. Chapter 1, "The Philosophy of Surgery," should be required reading for every premedical and medical student, while the older surgeon will find in it an excellent restatement of his credo as originally defined by Hippocrates.

The portion on principles of surgery takes up topics of wound healing, fluid balance, chemistry, physiology, anatomy of the systems, treatment of burns, electrolyte balance and blood transfusions. The dangers and abuses of the latter are well stated. This portion is written with authority and attractively presented so much so that it is difficult to stop reading once one has started.

The section on the practice of surgery is amazing in the amount of ground that it covers and the excellent manner in which this is done. Practically all the systems and specialties are dealt with in detail. The articles on the stomach, intestines, pancreas, spleen, adrenals, and liver, with their many diseases and the differential diagnoses of their various dysfunctions are comprehensive, complete, and authoritative. The specialties also are well represented with excellent sections on orthopedics, both traumatic and nontraumatic, and thoracic, abdominal, genitourinary, gynecologic, and plastic surgery. The article on hernias is very good, although in my opinion the author is too much inclined to favor the Cooper's ligament repair, which has not had sufficient time to prove itself so far as late recurrences are concerned. Some of the illustrations in this section lack the clarity displayed by others in the book. In the section on plastic surgery, there is an error in labeling C and C prime in figure 477A on page 1180. This would alter the technic of the operation described, if one were not aware of it. Otherwise this portion of the book is well worthwhile.

Many articles of great value that are not found in most books on surgery are included in this volume. I refer particularly to the sections on surgery of the hand, surgery of pulmonary tuberculosis, peripheral vascular surgery, and pediatric surgery. At long last we have an excellent presentation of the latter as differentiated from surgery of the adult. The division on military surgery is most timely and well done.

Malignant tumors are discussed as a whole and as found in each system of the body, along with the surgery, radiation therapy (advan-

tages and dangers of) and current chemical and endocrine factors used for their curative or palliative qualities

This is the finest book on the subject of the principles and the practice of surgery that has been published. It will be of great value not only to the medical student, intern and resident but also to the actively practicing surgeon who wants a rapid review of the principles and techniques of the more commonly performed operations. Certainly it should be in every medical library and I am sure that a great many surgeons will find it indispensable.—**LAWRENCE L. BEAN** Capt MC USN

**THE YEAR BOOK OF ORTHOPEDICS AND TRAUMATIC SURGERY (1956-1957 Year Book Series)** edited by *Eduard L. Compere* M D F A C S F I C S 336 pages illustrated The Year Book Publishers Inc Chicago Ill 1957 Price \$6.75

As in the past this volume should be of interest to surgeons in general and orthopedic surgeons in particular as a concise review of pertinent current orthopedic literature. Representative orthopedic articles published in medical journals between November 1955 and November 1956 are abstracted in a clear and well written manner. The illustrations are well reproduced and the editorial comments are thoughtful. The articles are selected and grouped to reveal current trends in this field. Up-to-date information is presented regarding such timely problems as geriatrics and osteoporosis, nonunion of fractures, internal fixation of fractures, bone grafts and bone banks, treatment of tuberculosis, intervertebral disk lesions, whiplash\* injuries, treatment of arthritis, and use of antibiotics. The volume provides a good reference work for a more detailed study of the original article.

—**EARL W. BRANNON** Lt Col USAF (MC)

**SURGICAL GYNECOLOGY** Including Important OBSTETRIC OPERATIONS *A Handbook of Operative Surgery* by *J. P. Greenhill* M D Illustrated by *Agela Bartnach* 2d edition 377 pages illustrated The Year Book Publishers Inc Chicago Ill 1957 Price \$9.50

This monograph in atlas form is written expressly for the student gynecology resident and general practitioner who does occasional gynecologic surgery. The text is easily understood and is excellently supported by 107 pen and ink plates.

The book is divided into four major sections, the first of which is on Preoperative Preparation and Postoperative Care and Complications. These are presented adequately and the section is well worth reading by anyone doing pelvic surgery. The other sections deal with Vulvar and Perineal Operations, Vaginal Operations, and Abdominal Operations. In these sections the author has included all the usual gynecologic procedures plus some urologic and general surgical procedures for repair of bowel and urinary tract injuries resultant from operations in the pelvis. In general the book is well organized and very easily assimilated. It is a must for all students and residents in gynecology but will not materially aid the specialist in this field.

—**WILLIAMS BAKER** J Capt MC USN

1957 MEDICAL PROGRESS, A Review of Medical Advances During 1956, by Morris Fishbein, M. D. 367 pages. The Blakiston Division, McGraw-Hill Book Co., Inc., New York, N. Y. 1957. Price \$6.

Again the editor has succeeded in publishing, in concise readable form the best from the 1956 medical literature. Ably assisted by 20 contributors, who for the most part are well known in their respective fields, the outstanding advances and achievements during the year are reported on entire subjects such as general aspects to single disease entities such as diabetes by the famed D. Elliot P. Jordan.

There is little to be criticized in the volume with the possible exception of too much space being devoted to subjects of restricted interest. For those who seek a quick source of information covering recent advances the book is valuable and for those who wish to cover a subject more extensively, the bibliography is very complete. It is manifestly impossible to pay tribute to each investigator and each achievement recorded within the year as time and space will not permit.

—MIRIAM L. DISSELHOR, Col. A.C.L.S.

THE LEUKEMIAS, Etiology, Pathophysiology, and Treatment, edited by John W. Rebuck, Frank H. Hellbell, and Raymond W. Monto. A Henry Ford Hospital International Symposium. 711 pages, illustrated. Academic Press, Inc., New York, N. Y. 1957. Price \$13.

This is a comprehensive, up-to-date volume on the leukemias. It consists of an edited collection of papers presented at the International Symposium on the Leukemias, Etiology and Pathophysiology, held at the Henry Ford Hospital, Detroit, Mich. 8-10 March 1956.

The work represents the efforts of 57 participants. All are outstanding authorities on the leukemias and related entities. The majority of the contributors are from the United States. England, Canada, France, Denmark, Italy, and Switzerland are represented by leading individuals in the field. There are 39 chapters divided into eight general areas of discussion as follows: the leukemic cell, its structure and antigenicity; genetic and environmental factors in the transmission of leukemia; radiation biology of leukocytes, the leukemias and the malignant lymphomas; leukocytic physiology; metabolism of amino and nucleic acids in the leukemias; further biochemical considerations in the leukemias; and nucleic acids as the target for chemotherapy; mechanisms of drug action and resistance.

As pointed out in the preface, this volume gives the present complex position of leukemic etiology and pathophysiologic disturbance, a much needed knowledge of detailed leukocytic functions and comprehensive thought on the therapy of the leukemias. It establishes the basis of comparison in the earlier works in this field and points up the extensive and accelerated progress made in the last few years.

This book is highly recommended for anyone concerned with physiology or pathology of the leukocytes.

—FRANK M. TOWNSEND, Col. USAF (MC)

PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON THE PEACEFUL USES OF ATOMIC ENERGY Held in Geneva 8 August 20 August 1955 Volume 11 Biological Effects of Radiation 402 pages illustrated *United Nations Publications* 1956. Distributed by Columbia University Press New York N Y 1956. Price \$8

This volume is one of 16 comprising the Proceedings of the International Conference on the Peaceful Uses of Atomic Energy held in Geneva Switzerland in August 1955. It is not of course arranged as a textbook but for anyone who is acquainted with the fundamentals of radiobiology it is a superb review of the problems with which the science is concerned at the present time. This was to be expected when every country represented picked the best men and the most representative articles for presentation at this meeting.

These articles are for the most part of general interest as compared to the average article in a scientific journal dealing with minute and detailed research into specialized aspects of a subject. Tsuzuki, Japan's leading radiobiologist is the author of "Bio-Medical Effects of Nuclear Energy: the Early Effects of Radiation Injury" and "Injury due to Radioactive Fall out." In this last article which presents the cases of the Japanese fishermen of the fishing boat "Lucky Dragon" who were caught in the fall out of the megaton weapon in March of 1954, it is interesting that Professor Tsuzuki lists first among the causes of the liver disease suffered by these fishermen serum hepatitis caused by repeated transfusions.

Professor Bacq of Belgium who has done an immense amount of work on chemical protection against radiation has an article on this subject but to offset presenting the views of only one man no matter how eminent there are several articles by other authorities on protection by chemical and other means. Muller the Nobel Prize winner presents in a masterly fashion some of the genetic problems posed by radiation in his paper "Radiation and the Genetic Constitution." Looney who has worked for a number of years collecting data on patients who have had radium and thorium administered to them has an article on "Radium and Thorium Excretion in Man." There is an article on the "Effect of Radiation Dose and Shortening of Life Span" by Blair of Rochester in which his concept of the mathematical representation of the relationship between radiation dose and life span is set forth.

Any critical comments are of minor importance and do not detract greatly from the value of the book. In the preface it is stated that editing for style was minimal in the interests of early publication and misprints and incorrect or awkward diction are frequent.

The volume is well bound the paper and printing are of good quality and the photographs are well reproduced. The book is highly recommended to all who are interested in the field of radiobiology.

—JOHN A O'DONOGHUE Capt MC USN

**BRITISH MEDICAL BULLETIN** Volume 34 Number 1 January 1957 213 pages and Pathology of the Kidney 24 pages illustrated Published by the Medical Dept. The British Council London 31 England Distributed by Oxford University Press New York N.Y., January 1, 1957 Price \$3.75

This volume in the series of the British Medical Bulletin is composed of 16 articles dealing with the pathology and physiology of the kidney. The articles are written by a group of clinical investigators, pathologists, radiologists, physiologists, biochemists and medical physicists headed by Professor Robert Platt of the University of Manchester.

Each article is prefaced by an outline of its contents. Physiological principles are discussed in the light of recent research. There are didactic presentation with many references to experimental literature. The reproductions of radiographs and photomicrographs are excellent.

This is a stellar assembly of the latest known facts pertaining to the basic sciences of the kidney unusually well organized and beautifully presented for the residency training program. Not only in urology but other specialties it serves a real and valuable purpose. Multiple sources of information each authoritative are represented. It is exceedingly useful as a library file for reference in looking up specific and special information during the first two years of residency training. The great detail in which the varied subjects are presented will assist the most zealous reader or student. —*FARI C. LOWERY Col MC USA*

**EPILEPSY Grand Mal Petit Mal Convulsions** by *Fetula Fairfield* C. B. 1 M. D. D. P. H. 159 pages illustrated Philosophical Library, Inc. New York N.Y., 1957 Price \$4.75

This small volume appears to be designed chiefly for social workers, teachers, and officials whose duties are concerned with epileptics. However, it is of value to physicians and students who are interested in the problems that arise in the social and economic adjustment of the epileptic child or adult.

The book deals briefly, though adequately enough considering the purpose for which it was written, with the history, diagnosis and treatment of the various forms of epilepsy. It contains a discussion of the various problems that arise in the social or economic adjustment of epileptics in school, the community, or on the job. The problems of institutional care are considered at length and the legal aspects and laws concerning epileptics are discussed. Since the author is British, these problems are discussed from that viewpoint and the various British institutions and agencies available to the epileptic in England are listed. To some degree this makes the book of more immediate value to a worker in Great Britain. Nevertheless, it can be of considerable value to the worker in this country as the author's statements are sound and sensible. The book is simply and clearly written. It is recommended to all those whose work involves the treatment and care of epileptics. —*JAY F. TUTTLE Lt Col MC USA*

HEMORRHAGIC DISEASES by *Armand J Quick* Ph D M D 451 pages  
37 illustrations Lea & Febiger Philadelphia Pa 1957 Price \$9.50

An excellent text for the practicing hematologist and internist. The author's vast experience in the field of blood dyscrasias serves him well in handling an extremely difficult field of many diverse opinions. The scope of the book is comprehensive. Its historical aspects are both delightful and revealing but are marred at times by the author's tendency to emphasize repeatedly his contributions and criticisms. Sustained new advances in the field of coagulation, hemostasis and thrombocytopenia are well described. The method of presentation is effective but occasionally suffers from rambling discussion. Ideas are presented clearly, discussed thoroughly and logically summarized. The bibliography constitutes an excellent compilation of the classics in the field. The second section of the book is devoted to laboratory methods; descriptions are adequately presented and the comments and suggestions will be helpful to those interested in technique. This is an exceedingly good book and is recommended for all interested in the field of hematology — *JOSEPH H ANEROYD* Lt Col MC USA

GOUT by *John H Talbot* A B M D D Sc (Hon) 205 pages illustrated  
Grune & Stratton Inc New York N Y 1957 Price \$6.75

This short but thorough monograph is a complete revision of the author's earlier work "Gout and Gouty Arthritis" which was published in 1953. The present work is replete with illustrative material including graphs, roentgenograms and photographs in color and black and white. The coverage of the subject is extensive and thorough with every imaginable facet of gout represented under chapters dealing with history, definition, heredity, metabolism of uric acid, precipitating agents and many other chapters in addition to the usual ones on diagnosis, differential diagnosis, etiology, et cetera. The bibliography consists of 285 references.

The monograph serves a very valuable function in bringing together in one work all the various metabolic, clinical, therapeutic and laboratory aspects of a much written about but still poorly understood subject. The coverage ranges in its scope from the historical aspects to the latest in research developments. Both theoretical and practical material are integrated so as to aid in the understanding of clinical cases. Therapy of the acute and chronic forms of the disease is very well covered.

I would classify this book as one useful primarily for the internist whether he be rheumatologist or general internist since this disease enters the picture in the differential of every patient manifesting joint abnormalities, kidney failure, renal calculi, albuminuria and even hypertension. Familiarity with this condition is especially important because it is one disease in which we have some measure of controllability amidst so many others considered in its differential for which our armamentarium is so inadequate or futile.

—*DAVID L. DEUTSCH* Lt Col MC USA

See entry 1957

LEAHY OF THE 1957

1957

PSYCHOTHERAPY OF THE ADOLESCENT edited by Herma H. Lehman  
M. D. 370 pages International Universities Press Inc. New York  
1957 Price \$5

This book is the outgrowth of a symposium on "The Adolescent" of the American Psychiatric Association in May 1955 at the meeting of the American Psychiatric Association in Atlantic City. Its aim is to provide a reference source for psychologists of the adolescent but in the reviewer's opinion is not a reference book on the subject. One could not for example find specific information regarding the treatment or scope of alcoholism or drug addiction in a teenager's art. It is more useful and much more readable than the usual reference books. Diagnostic categories are easily recognized. The psychiatric problems of adolescents being treated from the standpoint of inpatient or outpatient practice. The reader follows the treatment of a teenager in private practice in private practice plus school practice in school practice plus some inpatient treatment in the outpatient clinic in a pediatrics inpatient service and in an intensive hospital treatment setting. He sees how school teachers can and do handle superficial psychotherapeutic problems as they arise.

The authors in each case are very well qualified to discuss their particular subject, and they draw upon a wealth of experience. Each expresses his opinion freely, unaware of what the other contributors had written. Despite this a surprising unanimity of opinion obtains throughout.

Each chapter and section is illustrated with interesting and informative case summaries. In addition one chapter is devoted to a verbatim psychotherapeutic interview with an adolescent and includes pertinent dynamic comments. Each major section is well summarized and clarified by a discussion. These factors, along with the excellent organization of the book make it extremely readable and interesting and give it a continuity most symposia lack. Adolescence emerges as a much more understandable and less frightening period with which to deal therapeutically. It is seen in broad perspective for a better understanding of its normal developmental phenomena. The authors for the most part deal in specifics rather than generalities so that one can learn a great deal about adolescents and their treatment from this book. Much information emerges that is valuable with regard to preventive measures that can be used during this age period particularly with reference to the role of the school.

This is an extremely readable, informative, concise, relatively brief book that fills a vital need in psychiatric literature and training. The book is highly recommended for anyone doing psychotherapy with this age group and should be of considerable interest to all psychiatrists, psychologists, social workers, pediatricians, general practitioners and others concerned in the teaching and education of this age group.

—DASILE SMITH Lt Col USAF (MC)



DISEASES AND DISORDERS OF THE COLON by Anthony Bassler M D  
F A C P F A C G LL D 217 pages illustrated Charles C  
Thomas Publisher Springfield Ill 1957 Price \$6.75

This book is unique in that it contains no formal bibliography. The opinions expressed in it are largely the author's own viewpoints based on his wide experience and rich store of clinical material gleaned during his many years of practice in a large metropolitan center.

To cover diseases of the colon adequately in 200 pages is an almost impossible task and of necessity many facets of the subject are touched on lightly or omitted entirely. As might be anticipated from one who has lived through many decades of gastroenterologic opinion, the author has formulated many of his own theories on bowel dysfunction and treatment. Some of these are at variance with those currently held. For example, he believes that chilling of the abdomen may be a cause of acute colitis; that infections of the head and throat may be significant in the etiology of ulcerative colitis; and that the terms irritable or unstable colon should be dropped from the medical literature and replaced by "entity names instead." A lengthy chapter is devoted to what the author terms Chronic Biotoxic Intestinal States, which he believes are manifested by such ill-defined symptoms as belching, excessive flatus, fatigue, weight loss, mental depression, abdominal colic or cramping, skin disorders, back and leg pains, excessive passage of mucus, hyperacidity, et cetera. These "biotoxic states," he thinks may be caused by the swallowing of infection from the mouth (sepsis, pyorrhea), throat (infected tonsils), tracheobronchial tract and cranial sinuses, or may result from intestinal stasis, kinks, prosis, bands, et cetera.

Some of the therapeutic measures recommended hark back to bygone days and are no longer generally employed—the treatment of acute appendicitis with sterilized sulfanilamide intraperitoneally, the use of intravenous Mercurochrome and Bergen's vaccine for ulcerative colitis, the administration of Salvarsan, Neosalvarsan, or Mapharsen (no mention of penicillin) for syphilitic ulceration of the bowel and rectum, the giving of thyroid extract for intestinal influenza, and the use of deep x-ray therapy for diverticulitis.

Certain chapters in the book seem to be miscaptioned. The chapter on "Parasitic Diarrheal Infestations" includes the diarrheas due to parathyroid disease, hypoadrenalism, and hyperthyroidism, as well as a section on staphylococcus dysentery. A later chapter entitled "Parasitic Disorders" fully covers parasitic disease of the bowel. The chapter on "So-called Functional States" includes such unrelated subjects as intra-abdominal or visceral injuries, foreign bodies in the intestine, intestinal sand, and enteroliths.

While this book contains much that is valuable for the clinician, it could be greatly improved by careful editing, revision, and consolidation.—EMMETT L. AERHOL, Col. MC USA

**DRUG MECHANISMS AND DRUG ACTION. A Symposium.** Fourth Annual Scientific Meeting of the Houston Neurological Society, Texas Medical Center, Houston, Tex. Compiled and edited by William S. Fields. 147 pages, illustrated. Charles C. Thomas, Publisher, Springfield Ill., 1957. Price \$4.25.

Relatively new drugs, such as reserpine and chlorpromazine have aroused considerable interest in regard to their precise mode of action on the nervous system. Some of the recent basic research attempting to clarify this problem is reflected in this symposium.

How do these drugs accomplish their purpose? Perhaps with this in mind the symposium opened with a presentation of reticular formation neurophysiology. Dr. Robert S. Livingston found that the cortex via centrifugal fibers to the reticular formation may have the capacity to regulate the arousal response and even the content of consciousness. Bearing these connections in mind, it becomes a little easier to understand that drugs acting on the reticular formation may have psychic, emotional or other effects, such as parkinsonism. This is elaborated by Drs. Harold F. Dowditch and Franco Rinaldi, who conclude that these drugs have an upward centripetal or a downward centrifugal effect. By specificity of drug or dosage the upward or downward effects may be those of depression or stimulation.

In an attempt to deal with fundamental units, the neuron and the synapse, Dr. Amedeo S. Marazzi studied the transmission of evoked potentials of these units when influenced by the action and counteraction of various agents including psychotropics, hallucinogens and tranquilizers.

By what selective influence do these drugs act? Dr. Evelyn Killam and Keith F. Killam investigated drug effects on different sites along neuraxial afferent pathways, such as lemniscus, capsule and reticular formation. Dr. Roger Guillemin demonstrated some of the endocrine implications. The broader aspect of certain drug effects on behavior of laboratory animals was explored by Dr. Joseph V. Brady, using the free operant technique. In a masterful summary, Dr. David McK. Ritchie integrates the previous contributions and discusses other aspects of the problem.

For those with special interest in psychic pharmacology, a few pleasurable and informative hours may be well spent by perusal of this symposium. The bibliography appended to each of the six major contributions references further sources on other phases of these subjects.

—ARTHUR J. LEVINS, Lt. Col. MC USA

## New Books Received

Books received by the *U S Armed Forces Medical Journal* are acknowledged in this department. Those of greatest interest will be reviewed in a later issue.

- THE PHYSIOLOGY AND BIOCHEMISTRY OF LACTATION** by *S. J. Folley*  
D Sc Pb D F R S 153 pages illustrated Charles C Thomas  
Publisher Springfield Ill 1956. Price \$3.75
- PHYSIOPATHOLOGY OF THE RETICULO-ENDOTHELIAL SYSTEM** A  
Symposium organized by The Council for International Organizations  
of Medical Sciences established under the joint auspices of UNESCO  
and WHO Edited under the direction of *B. N. Halpern, B. Benacerraf*  
and *J. F. Delafresnaye* 317 pages illustrated. Charles C Thomas  
Publisher Springfield Ill 1957 Price \$9
- FUNDAMENTALS OF GENERAL SURGERY** by *John Arnes Gier* M D  
D Sc (Med) F A C S 720 pages illustrated The Year Book Pub-  
lishers Inc Chicago Ill 1957 Price \$12.50
- SPONTANEOUS AND HABITUAL ABORTION** by *Carl T. Javert* M D 450  
pages illustrated The Blakiston Division McGraw-Hill Book Co  
Inc New York N Y 1957 Price \$11
- SURGENS ALL** by *Harvey Grabam* M D Foreword by *Oliver St. John*  
*Goga* ty 459 pages illustrated Philosophical Library New York  
N Y 1957 Price \$10
- MEDICAL NURSING** by *Amy Frances Brown*, R N B Ed M S in N  
Pb D 3d edition 947 pages 447 illustrations 42 in color on 32  
figures W B Saunders Co Philadelphia Pa 1957
- THE PATHOGENESIS OF CHRONARY OCCLUSION** by *A. D. Morgan* M A  
M D With a foreword by *John B. Duguid* M D 171 pages illustrated  
Charles C Thomas Publisher Springfield Ill 1956. Price \$8.50
- ATLAS OF EYE SURGERY** by *R. Townley Paton* M D F A C S. *Herbert*  
*M. Katzir*, M D F A C S and *Daisy St. Luell* Illustrator 248 pages  
illustrated The Blakiston Division McGraw-Hill Book Co Inc New  
York N Y 1957 Price \$15
- AN ATLAS OF CARDIAC SURGERY** prepared by *Jorge A. Rodriguez* M D  
250 pages illustrated W B Saunders Co Philadelphia Pa 1957
- DENTAL CLINICS OF NORTH AMERICA** Symposium on Emergencies in  
Dental Practice *Jam. S. R. Cameo* D D S guest editor and 26  
contributors 617 pages illustrated W B Saunders Co Philadelphia  
Pa. July 1957
- BLOOD PRESSURE SOUNDS AND THEIR MEANINGS** by *John Erskine Hal-*  
*colm* B Sc M B Ch B F R C S 93 pages illustrated Charles  
C Thomas Publisher Springfield Ill 1957 Price \$2.50
- A PRACTICAL HANDBOOK OF PSYCHIATRY** for Students and Nurses by  
*Louis M. Sklar* M D F R C P D P M 3d edition 144 pages  
Charles C Thomas Publisher Springfield Ill 1956. Price \$3

- THE YEAR BOOK OF PATHOLOGY AND CLINICAL PATHOLOGY (1956-1957 Year Book Series) edited by William H. Dartman, B. S., M. D. 510 pages illustrated. The Year Book Publishers, Inc. Chicago, Ill. 1957. Price \$7.
- TRIVIES' SURGICAL APPLIED ANATOMY, revised by Lambert Charles Rogers, V. P. D., M. D., M. Sc., F. R. C. S., F. R. C. S. E., F. R. A. C. S., F. A. C. S. 13th edition. 591 pages, 50 illustrations, 56 in color. Lea Febiger, Philadelphia, Pa. 1957. Price \$7.50.
- THE YEAR BOOK OF PNEUMONOLOGY (1956-1957 Year Book Series) edited by Gilbert S. Lofgren, M. D., Ph. D., F. A. C. P. 377 pages illustrated. The Year Book Publishers, Inc. Chicago, Ill. 1957. Price \$6.75.
- SUPRAPHILIC CLOSURE OF VISCEROVISCERAL FISTULA by Vincent J. O'Connor, B. S., M. D., F. A. C. S. American Lecture Series Publication No. 306. A Monograph in American Lectures in Surgery, edited by Gerald M. Swartz, M. D., F. A. C. S. 33 pages illustrated. Charles C. Thomas, Publisher, Springfield, Ill. 1957. Price \$1.50.
- THE DIAGNOSIS AND TREATMENT OF PULMONARY TUBERCULOSIS by Paul Dufault, M. D. With chapters on Pathology by A. Frenkel, M. D., and Pulmonary Function by Oscar Forrester, M. D. 2d edition. 476 pages, 167 illustrations and 1 plate in color. Lea Febiger, Philadelphia, Pa. 1957. Price \$9.
- ANATOMICAL SECTION: ANATOMY OF THE HEAD AND NECK by Otto Frederick Lampert, Ph. D., M. D., Arthur A. Conner, Ph. D., M. D., and Thomas S. Johnson, B. S., F. A. C. S. 64 pages illustrated. University of Illinois Press, Urbana, Ill. 1957. Price \$15.
- CLINICAL PHYSIOLOGY: The Functional Pathology of Disease, edited by Arthur Grollman, M. D., Ph. D., F. A. C. P. 654 pages illustrated. The Blakiston Division, McGraw-Hill Book Co., Inc. New York, N. Y. 1957. Price \$12.50.
- MEDICAL DEPARTMENT UNITED STATES ARMY: Surgery in World War II. Orthopedic Surgery in the Mediterranean Theater of Operations by Colonel Oscar S. Hamilton, Jr., MC, USAF. 364 pages illustrated. Editor-in-Chief, Colonel John Boyd Coster, Jr., MC. Editor for Orthopedic Surgery, Walter Cleveland, M. D., Associate Editor, Eliabeth V. McEtridg, M. A. Historical Unit, Army Medical Service, Office of the Surgeon General, Department of the Army, Washington 25, D. C. 1957. For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Price \$4.
- THE YEAR BOOK OF NEUROLOGY, PSYCHIATRY AND NEUROSURGERY (1956-1957 Year Book Series). Neurology, edited by Roland F. Mackay, M. D. Psychiatry, edited by S. Bernard Wortis, M. D. Neurosurgery, edited by Oscar Sugar, M. D. 596 pages illustrated. The Year Book Publishers, Inc., Chicago, Ill. 1957. Price \$7.
- CELL PHYSIOLOGY by Arthur C. Giese, Ph. D. 531 pages illustrated. W. B. Saunders Co., Philadelphia, Pa. 1957.
- Collected Paper of THE MAYO CLINIC and The Mayo Foundation, edited by Richard M. Hewitt, B. A., M. A., M. D., John R. Miner, B. A., M. A., Ph. D., Katharine Smith, B. A., Carl M. Gambill, A. B., M. D., M. P. H., Florence L. Schmidt, B. S. I., and George G. Stilwell, A. B., M. D., and Guy Whitehead, B. A., M. A., Ph. D. Volume 48, 1956. 778 pages illustrated. W. B. Saunders Co., Philadelphia, Pa. 1957.

- PSYCHOSOMATIC NEOICENE** A Clinical Study of Psychophysiologic Reactions by *Eduard Weiss* M D and *O. Spurgeon English* M O 3d edition 557 pages W B Saunders Co Philadelphia Pa 1957
- SYSTEMIC ARTERIAL EMBOLISM** Pathogenesis and Prophylaxis by *John Martin Askey* M O 157 pages illustrated Grune & Stratton Inc New York N Y 1957 Price \$5.75
- J. A. M. A CLINICAL ABSTRACTS OF DIAGNOSIS AND TREATMENT** Published with the Approval of the Board of Trustees American Medical Association 564 pages Intercontinental Medical Book Corp with Grune & Stratton Inc New York N Y 1957 Price \$5.50
- SCHIZOPHRENIA IN PSYCHOANALYTIC OFFICE PRACTICE** The Society of Medical Psychoanalysts 1956 Symposium edited by *Alfred H. Riklin* M O 30 contributors 150 pages Grune & Stratton Inc New York N Y 1957 Price \$4
- THE ELECTROCARDIOGRAM** Its Interpretation and Clinical Application by *Louis H. Sgile* M O F A C P F C C P F A C C 2d edition revised 312 pages illustrated Grune & Stratton Inc New York N Y 1957 Price \$8.75
- PROGRESS IN PSYCHOTHERAPY** edited by *Jules H. Masserman* M O and *J. L. Moreno* M D Volume 2 Anxiety and Therapy 264 pages Grune & Stratton Inc New York N Y 1957 Price \$7.50
- PERIPHERAL CIRCULATION IN HEALTH AND DISEASE** by *Walter Redisch* M D F A C P and *Francisco F. Tanco* M D B S. with a special section by *R. L. deC. H. Saunders* M D F R S E and associates 154 pages illustrated Grune & Stratton Inc New York N Y 1957 Price \$7.75
- BRONCHOPULMONARY DISEASES** Basic Aspects Diagnosis and Treatment by 147 authors Edited by *Ernest A. Vaccaro* M D foreword by *Richard H. Overholt* M D 956 pages 719 illustrations Paul B. Hoeber Inc Medical Book Department of Harper & Brothers New York N Y 1957 Price \$24
- KAPOSI'S SARCOMA** Multiple Idiopathic Hemorrhagic Sarcoma by *Samuel M. Blumberg* B S M O F A C P American Lecture Series Publication No. 308 A Monograph in The Bannerstone Division of American Lectures in Dermatology edited by *Arthur C. Curtis* M O 171 pages illustrated Charles C. Thomas Publisher Springfield Ill 1957 Price \$5.50
- DEGENERATIVE CHANGES IN THE STERNOCLAVICULAR AND ACROMIOCLAVICULAR JOINTS IN VARIOUS DECADES** by *Anthony F. DePalma* M O American Lecture Series Publication No. 309 A Monograph in The Bannerstone Division of American Lectures in Orthopaedic Surgery edited by *Charles Weer Goff* M D 178 pages illustrated Charles C. Thomas Publisher Springfield Ill 1957 Price \$5.50
- PLASTIC ARTERIAL GRAFTS** by *W. Stealing Edwards* M D 126 pages illustrated Charles C. Thomas Publisher Springfield Ill 1957 Price \$4.50
- THE SURGICAL MANAGEMENT OF PULMONARY TUBERCULOSIS** edited by *John D. Steele* M O Publication No. 1 The John Alexander Monograph Series on Various Phases of Thoracic Surgery Edited by *John D. Steele* M D 213 pages illustrated Charles C. Thomas Publisher Springfield Ill 1957 Price \$9.50
- PSYCHIATRY IN THEORY AND PRACTICE** by *Beulah Chamberlain Boss* Iman, M D 150 pages Charles C. Thomas Publisher Springfield Ill 1957 Price \$4

# UNITED STATES ARMED FORCES MEDICAL JOURNAL

*Published Monthly by  
the Armed Forces Medical Publication Agency  
Department of Defense*



*Editor*

CAPTAIN BENNETT I. AVERY, MC, USN

*Associate Editors*

COLONEL ROBERT S. ANDERSON, MC, USA  
COLONEL ROBERT J. BENFORD, USAF (MC)

*Assistant Editor*

LIEUTENANT ROBERT DRUYAN, MC, USNR

UNITED STATES  
GOVERNMENT PRINTING OFFICE  
WASHINGTON 1957

THE PRINTING OF THIS PUBLICATION HAS BEEN APPROVED BY  
THE DIRECTOR OF THE BUREAU OF THE BUDGET, 20 FEB 1956

## Monthly Message

Mr Clarence B Randall, Special Assistant to the President, has kindly granted me permission to quote the final paragraphs of his article, "The High Adventure," one of a series of lectures which he gave at harvard University during the past year

Today the young man must see his job against the background of mankind's struggle for survival. A new destiny awaits him from which there is no escape

"From this very gravity of our problems is sure to come a new earnestness of purpose and a new understanding of the significance of education itself

•

"The ultimate test of any intellectual discipline however is not what it does for others but what it achieves within the life of the particular individual. The cultivation of the mind and the illumination of the spirit are ends in themselves and bring their own rewards. Education is too precious a thing to be measured by a money index. Obviously it is important that each of us know how to make a living but that is not the ultimate purpose of life itself. Far more important than the making of a living is the living of the life and the highest aim of all education must be to make life richer and fuller. As the man grows within himself his company gains and society gains but it is the inner growth which must be the end sought

"Today the challenges are far greater far more exciting. Young men with vision will see this and will accept the new responsibilities with eagerness and without fear

The rewards for living worthily transcend anything that human history has known. They will go to those who by cultivation of the mind and illumination of the spirit reach the highest level of inner growth."

*Frank B Berry*

FRANK B BERRY  
Assistant Secretary of Defense  
(Health and Medical)

# Table of Contents

	Page
The Treatment of Rheumatic Carditis With Cortisone— <i>Horace C. Gibson</i> .....	1405
A New Overhead Anesthetic Panel for Pipod Gases Vacuum and Electric Outlets— <i>James B. Butler Frank Moya and John S. Lundy</i> .....	1430
Effect of Prochlorperazine on Psychologic Psychomotor and Muscular Performance— <i>Ired B. Benjamin Kimio Ikar and Henry F. Clare</i> .....	1433
Weever Stings and Their Medical Management— <i>Bruce W. Halstead</i> .....	1441
Suitability of Ivalon Sponge Tubes for Replacing Vascular Segments— <i>Julia C. Davila Dale Stult and Llore M. Aronstam</i> .....	1452
Reduction of Ionizing Radiation in Diagnostic Roentgenology— <i>Archibald G. M. Martin III</i> .....	1467
CLINICOPATHOLOGIC CONFERENCE	
William Beaumont Army Hospital Fort Bliss Tex .....	1476
SERVICE ARTICLES	
Accuracy of Prediction of Military Success or Failure: A Follow Up Study— <i>Robert L. Williams and Isaiah M. Zimmerman</i> .....	1487
Use of the Membrane Filter for Potable Water in the Air Force— <i>Thomas C. Jones</i> .....	1495
CASE REPORTS	
Uncomplicated Pregnancy Following Bilateral Lung Lobectomies— <i>Zachary T. Trounck Arthur Leber and Archibald G. M. Martin III</i> .....	1507
Generalized Skin Eruption Caused by Bromsulpholein— <i>David L. Deutsch Otto W. Neuburger and Oswald R. Jensen</i> .....	1514
Hindquarter Amputation for Hip Chondrosarcoma— <i>Earl W. Bronnon and John F. Tracey</i> .....	1517
Thoughts on the Ellis van Groveland Syndrome: Report of an Analogous Case— <i>Ronald A. Malt</i> .....	1527
DEPARTMENTS	
A Message From the A. M. A .....	1536
American Public Health Association to Meet in Cleveland .....	1538
Deaths .....	1539
Officers Certified by Specialty Boards .....	1540
Rehabilitation and Employment of the Physically Handicapped ..	1541
Six Medical Corps Officers Selected for General Officer and Flag Ranks ..	1542



BOOKS

Reviews of Recent Books .....	1543
New Books Received .....	1558

## Foreword

The *United States Armed Forces Medical Journal* is the medium for disseminating information of administrative and professional interest to all medical personnel of the Department of Defense. The Assistant Secretary of Defense (Health and Medical) and the Surgeons General of the several services invite all medical officers, dental officers, Medical Service Corps officers, Nurse Corps officers, and officers of the Veterinary Corps of the Armed Forces, and the medical consultants of the Army, Navy, and Air Force to submit manuscripts for publication in this journal.

FRANK B. BERRY, M.D.

*Assistant Secretary of Defense (Health and Medical)*

MAJOR GENERAL SILAS B. HAYS

*Surgeon General, United States Army*

REAR ADMIRAL BARTHOLOMEW F. HOGAN

*Surgeon General, United States Navy*

MAJOR GENERAL DAN C. OGLE

*Surgeon General, United States Air Force*

# UNITED STATES ARMED FORCES MEDICAL JOURNAL

---

Volume VIII

October 1957

Number 10

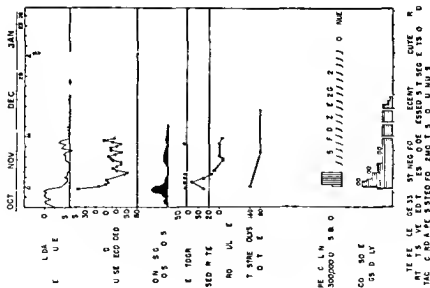
---

## THE TREATMENT OF RHEUMATIC CARDITIS WITH CORTISONE

HORACE C. GIBSON *Colonel MC USA (Ret)*

**D**URING the past few years, there have been several important advances in our knowledge of rheumatic fever. The most significant of these were (1) the accumulation of data incriminating beta hemolytic streptococci in the initiation of the train of events in rheumatic fever,<sup>1-3</sup> (2) the prevention of rheumatic fever by prompt penicillin therapy of hemolytic streptococcal respiratory infections,<sup>1,3,4</sup> (3) continuous penicillin prophylaxis in the rheumatic individual,<sup>1,4,5</sup> and (4) hormone suppression of the inflammatory process during the period of activity.<sup>1,4-6</sup>

The controversy that has been carried on in the medical literature for over six years concerning the usefulness of hormone therapy in rheumatic fever is largely due to inadequate reporting of detailed clinical data, particularly regarding the severity of the symptoms, the duration of the disease prior to beginning treatment, the adequacy of the dosage, and the duration of treatment throughout the entire period of clinical evidence of activity. It is believed that with detailed tabulation of cases, readers have a better chance of evaluating the method of treatment and the results. This article evaluates the treatment of active rheumatic carditis by prolonged bed rest, chemotherapeutic drugs, and hormones. Thirty eight cases are presented—12 in graphic form (figs 1-15), 15 individually, and 11 in summary (table 1). Only 3 of the patients were children, the rest were adults—3 dependents, 2 WACs, and 30 soldiers.



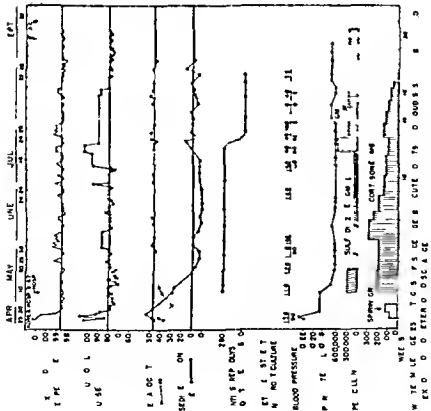


Figure 3 (case 3)

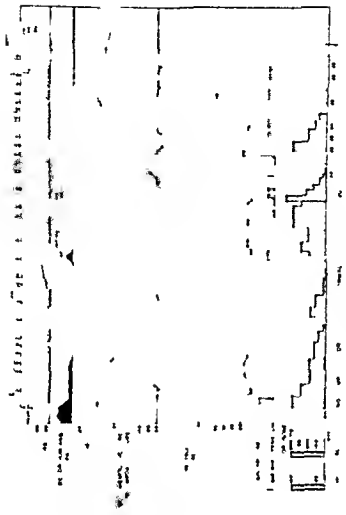


Figure 4 (case 4)

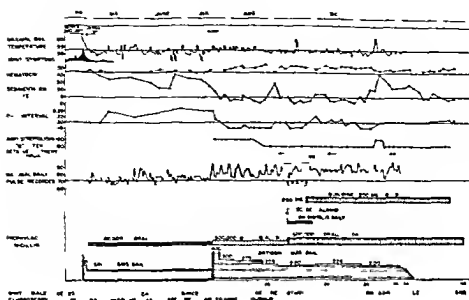


Figure 5 (case 5)

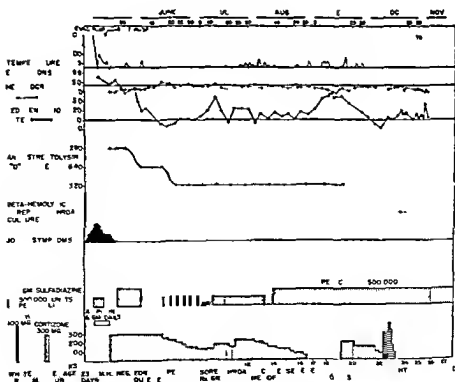


Figure 6 (case 6).

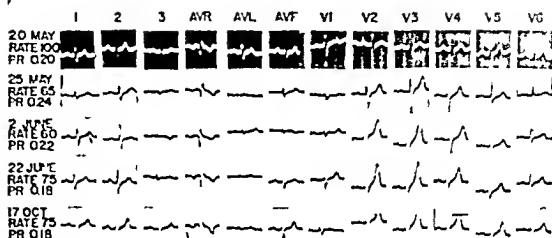


Figure 7 (case 7) Note PR prolongation and T wave changes during early phase of active treatment.

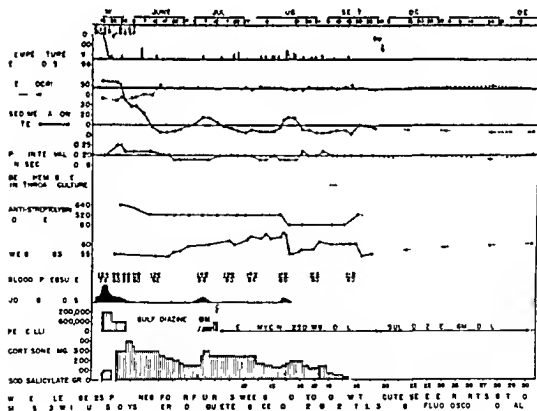
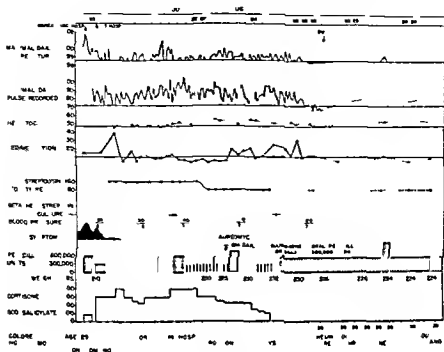
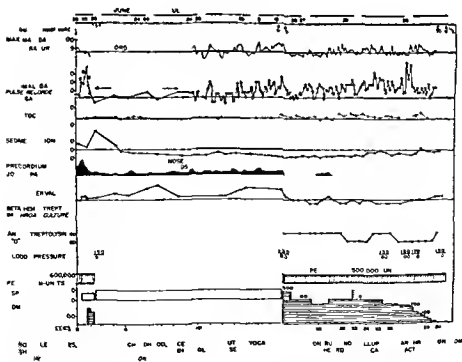


Figure 8 (case 7)



**Figure 9 (case 8)**



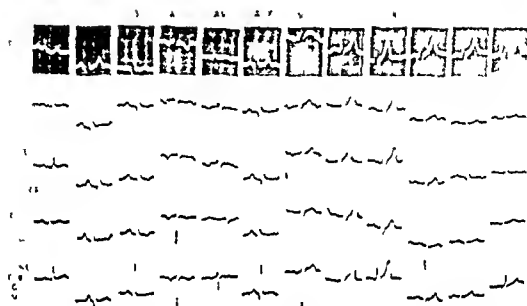


Figure 11 (case 10) Illustrating reversibility of prolonged P R interval and T wave abnormalities.

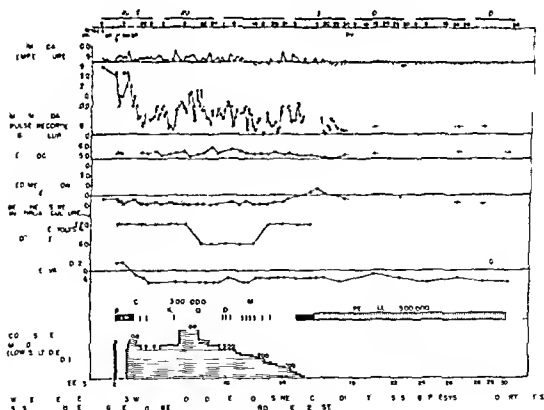
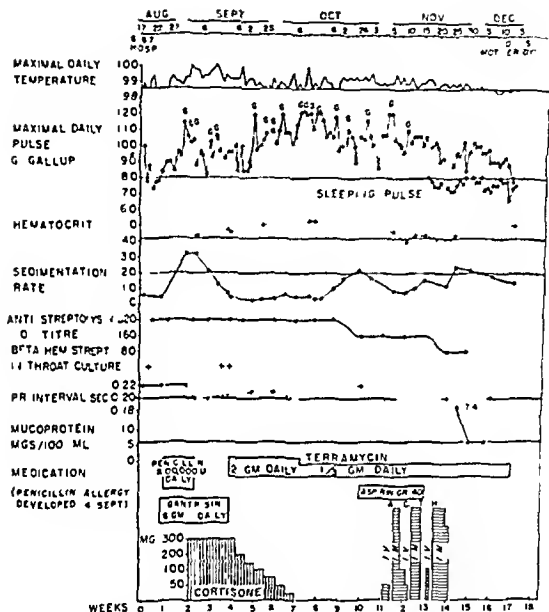


Figure 12 (case 10)







White female age 21 hist neg for R F or U R I only palpitation and dizziness on adm no arthralgia no murmur Diagnosis doubtful until apical systolic murmur developed 10 days after admission This was grade 1 on transfer Heart size normal Patient discharged to full duty 19 February 1954 after 6 months hospitalization Follow up report of physical examination 21 October 1955 grade II aortic systolic murmur P R interval 0.22 to 0.24 second No heart enlargement by x ray Otherwise negative Conclusion Inadequate early treatment

Figure 15 (case 12)

TABLE 15      y f d e 2      f b m i o n h i d d h i

H y d r h y i			C I I d						C t p s		(S I R it NP 1419 1420)		
C N Adm d R Sp if gh	I h y	C nd d	H	H o- P (L)	I c (Aly)	S f H oc T Aoc P O	X y R Huo eg	W k ed	Hg (d ly)	(I upre	C mpf	A fr ne	
13 8753 W F 243 11C lb	h R 151C 21 22 23 LPM unf 21 d y F	A u i ymp dy pr f pue T 101 F P 120	A udl N E N m E H H B P 140/40	2 dm g f w d	I x ft	S d m 39 H 33 Am P O 640	I h p 1 g h R h y p h 135 2C s Jmo 1 1 2 265	4 3 2 3 7	300 250 200 150 100	G od p p o r 1 100 mg	type I	N P d P d g C m P R I f	
14 810-93 # M 4 122 lb	FI 2 d s P dm	F d l P A N 99 F P 110	N g dm y m m I c A g E H m f I 21 A R	27 A	A h m T w d w g 1 R 0 12 0 14	C d 15 H m 43 A p r o c 108 mg A O 20	L I g d P l m n 22 A p h h O 20	3 1 11 1 2 2 4 300 1	Nb 300 400 N 300 400 300 AC.FH	F m m d h i c t d d u r m e	A 1 m type (140/110) f m m	h f for	
15 2 54 W H 183 1 0 lb	h m f e 11 f q 11 m 23 Se	N g r m y h h d h h w o m arf j h l p i	T 11C N m m 13 f t P i y pr		N m 1 R 0 20 1 wk R f w d	Sed 47 H m e 43 Am l P O 500	N g	32 4 2 2 4	h 300 00 150 100 75	Good	Mid	N	

chr 3 k pr 1 dm R with Aure my n l k	1 m ts them mae g natum	15 l b pr 1 l y reurn apex q ba e	Q 10	Set 41 Her 35 C 25 F 20 n 15 wk A 10 wk O 45	ef	1	50 25	110 100 100	110 100 100	1 k reoun!
16 3 20 54 W F 9 yr 62 lb	Rheum F 2 5 upper re p f 2 d y pr or to dm	Abd m nat P n lo se stool 2 days d rats n T 10 G E p 110	P R 0 14-0 15 after R 0 12	Set 41 Her 35 C 25 F 20 n 15 wk A 10 wk O 45	ef	1	50 25	110 100 100	110 100 100	1 k reoun!
17 4 1 54 W M 19 yr 144 lb	Ple m F 2 12 re ur of anh alga re od cily n e l q m 5 mo pr cto 1 m Lypers p nd 2 wk pr f i dm	Cre 11 ays A 4 pce 10 ys 1 re d t P m per	N 2 0 14-0 15 after R 0 12	Set 41 Her 35 C 25 F 20 n 15 wk A 10 wk O 45	ef	1	50 25	110 100 100	110 100 100	1 k reoun!
18 4 16-54 W M 28 yr 132 lb	Upper resp nd 14 d ys pr or to dm	Aure p m ymp e T 101 F P 110	J R 0 14-0 15 after R 0 12	Set 41 Her 35 C 25 F 20 n 15 wk A 10 wk O 45	ef	1	50 25	110 100 100	110 100 100	1 k reoun!
19 6-20 54 W M 20 yr 140 lb	Upper p nd 2 wk p to adm.	Aure symp k e f 5 day dur no T 105 F P 120	J R 0 14-0 15 after R 0 12	Set 41 Her 35 C 25 F 20 n 15 wk A 10 wk O 45	ef	1	50 25	110 100 100	110 100 100	1 k reoun!

TABLE 1	Summary of data	Number of cases	Number of deaths	Number of survivors
1	26	1	25	25
2	26	1	25	25
3	26	1	25	25
4	26	1	25	25
5	26	1	25	25
6	26	1	25	25
7	26	1	25	25
8	26	1	25	25
9	26	1	25	25
10	26	1	25	25
11	26	1	25	25
12	26	1	25	25
13	26	1	25	25
14	26	1	25	25
15	26	1	25	25
16	26	1	25	25
17	26	1	25	25
18	26	1	25	25
19	26	1	25	25
20	26	1	25	25
21	26	1	25	25
22	26	1	25	25
23	26	1	25	25
24	26	1	25	25
25	26	1	25	25
26	26	1	25	25
27	26	1	25	25
28	26	1	25	25
29	26	1	25	25
30	26	1	25	25
31	26	1	25	25
32	26	1	25	25
33	26	1	25	25
34	26	1	25	25
35	26	1	25	25
36	26	1	25	25
37	26	1	25	25
38	26	1	25	25
39	26	1	25	25
40	26	1	25	25
41	26	1	25	25
42	26	1	25	25
43	26	1	25	25
44	26	1	25	25
45	26	1	25	25
46	26	1	25	25
47	26	1	25	25
48	26	1	25	25
49	26	1	25	25
50	26	1	25	25
51	26	1	25	25
52	26	1	25	25
53	26	1	25	25
54	26	1	25	25
55	26	1	25	25
56	26	1	25	25
57	26	1	25	25
58	26	1	25	25
59	26	1	25	25
60	26	1	25	25
61	26	1	25	25
62	26	1	25	25
63	26	1	25	25
64	26	1	25	25
65	26	1	25	25
66	26	1	25	25
67	26	1	25	25
68	26	1	25	25
69	26	1	25	25
70	26	1	25	25
71	26	1	25	25
72	26	1	25	25
73	26	1	25	25
74	26	1	25	25
75	26	1	25	25
76	26	1	25	25
77	26	1	25	25
78	26	1	25	25
79	26	1	25	25
80	26	1	25	25
81	26	1	25	25
82	26	1	25	25
83	26	1	25	25
84	26	1	25	25
85	26	1	25	25
86	26	1	25	25
87	26	1	25	25
88	26	1	25	

Hory nat phy		C I I I						C <sub>h</sub> py		(S I R 1419 1420)		R	
C	N	U	U	C	H	B	I	X	k	(I	(	(	A
Alm d	Alm d	U	U	C	H	B	I	X	k	(I	(	(	A
AR	AR	U	U	C	H	B	I	X	k	(I	(	(	A
W	W	U	U	C	H	B	I	X	k	(I	(	(	A
kg	kg	U	U	C	H	B	I	X	k	(I	(	(	A
54	54	U	U	C	H	B	I	X	k	(I	(	(	A
105	105	U	U	C	H	B	I	X	k	(I	(	(	A
46 lb	46 lb	U	U	C	H	B	I	X	k	(I	(	(	A
154	154	U	U	C	H	B	I	X	k	(I	(	(	A
95	95	U	U	C	H	B	I	X	k	(I	(	(	A
338 lb	338 lb	U	U	C	H	B	I	X	k	(I	(	(	A
22	22	U	U	C	H	B	I	X	k	(I	(	(	A
24 54	24 54	U	U	C	H	B	I	X	k	(I	(	(	A
173	173	U	U	C	H	B	I	X	k	(I	(	(	A
338 lb	338 lb	U	U	C	H	B	I	X	k	(I	(	(	A
23	23	U	U	C	H	B	I	X	k	(I	(	(	A
10-4 54	10-4 54	U	U	C	H	B	I	X	k	(I	(	(	A
4 M	4 M	U	U	C	H	B	I	X	k	(I	(	(	A
8)	8)	U	U	C	H	B	I	X	k	(I	(	(	A
160 lb	160 lb	U	U	C	H	B	I	X	k	(I	(	(	A

24 1555 N M 18 yr 170 lb	No history of Rheum F or prior to admission	Chet up day 10 T 99.6 F 100	Gr 11 days rumin apex R 16 J n d a t m m per	p s on 2 Jan 3 Apr 1 May 5 Apr 19 Apr 12 Oct 11 Oct	Alveolar no dry T in case V V lumen through Sept over mal d i e after	Scd rate 41 Her r 33 C r c Price r e let trap O 50	W 1 Jan 10 J 9 Apr 4 Apr 11 May 1 Apr	ne 100 0 r none 100 50 to 150 100 100 70 40 to	1 per c n facies w h 112	low c n none f ur	one after c n t r c n
25 1135 W M 21 yr 10 lb (Fe 6)	Dyspnea p inf 1 mo per to admission	Acute arthritis left knee 1 k R 1 t retrax 1 d lit knee 2 day T 101.2 F 92	Gr 1 days mum t e a 1 liter allies er at 11 2 y lar with pt 1 s mum t per	re e r p ro 11 ty with fe r	I R O O A T A A aft r w p t O 16, A T at P	Scd rate 55 fer t 54	R Feb 20 Mar	100 10 100 150 100 5 1 5	100 10 100 150 100 5	Conf ed c n 10 lb white 100 mg f r e 1 A 15 n 110 mg	one after c n t r c n
26 320-55 W M 18 yr 160 lb	Soethroat 2 wk prior to admission	Acute rheum fever 10 hr ne r d y left foot c n s l lar T 101.6 F 10-132	T chy ca 1 s 25 11 y mum 1 ft of sternum	10 Mar 5 Jly 2 Apr 10	P R O O A on dm k m P R O 14	Scd rate 5 H m t 18 C c e P t 4 Apr F O J 50	eg on Apr retrax 1	100 50 100 150 100 150 100 50 5	100 50 100 150 100 150 100 50 5	Conf ed r r e lumen w c n moller on 150 mg retrax retrax n 40 A 5 mg	one after c n t r c n



## Additional Remarks, Final Examination, and Disposition

*Case 13* This patient a housewife was admitted to the hospital four times (total hospitalization 6 months) and also was treated as an outpatient. She received digitalis until 21 April 1954. Activity was not suppressed until August. Follow up on 15 November 1954 showed grade II aortic insufficiency and stenosis mitral insufficiency and blood pressure of 140/20 mm Hg. These were compensated and asymptomatic.

*Case 14* Throat cultures were positive 10, 16 September and 7, 24, 27 November and 5 December but negative thereafter. Carditis was active for 6 months. Chorea persisted until May 1954 (9 months). After May and at the time of the patient's discharge to duty 14 July 1954 the clinical findings were negative except for a grade II apical systolic murmur. The patient's weight had increased from 122 to 138 pounds.

*Case 15* This patient was treated with from 5.3 to 8 grams of salicylate daily for 5½ weeks with persistence of joint pains, heart murmurs, erythema marginatum and lowest sedimentation rate 19 mm. All findings except the heart murmurs subsided on cortisone therapy. The apical murmur gradually became a faint grade I systolic. The basal murmur remained grade II. Hospitalization was prolonged for convalescence, considerable dental work and a tonsillectomy. The patient was returned to duty with a P 3 profile on 6 January 1955.

*Case 16* Electrocardiographic changes with wandering pacemaker and a systolic murmur were demonstrated during the first three weeks of aspirin therapy. After cortisone therapy the electrocardiograms were normal, no murmur could be heard and the patient's weight increased from 60 to 90 pounds. The child returned to school September 1954. On the last examination 14 April 1955 clinical findings were negative and the child weighed 88 pounds.

*Case 17* This patient developed an apical diastolic murmur in 10 days while receiving 8 grams of aspirin daily but the murmur was not heard on 1 May or thereafter. By late September only a grade I systolic murmur was present at the base and apex. After rehabilitation the patient was discharged to duty 7 January 1955 on prophylactic penicillin.

*Case 18* This patient was discharged to duty 17 August 1954. At that time his heart size was normal, a grade I mitral insufficiency murmur could be heard after exercise, the P-R interval was 0.14 second and the patient's weight had increased from 132 to 158 pounds.

*Case 19* When this patient was returned to duty 30 August 1954 his heart was normal, the P-R interval was 0.16 second, he was asymptomatic and his weight had increased from 140 to 164 pounds.

*Case 20* The patient had a low grade fever for 6 weeks. He was returned to duty 3 November 1954 symptom free except for a grade I systolic murmur. Physical examination <sup>normal</sup> <sub>electrocardiogram</sub> antistreptolysin "O" titer C reactive protein <sub>normal</sub>.



fluoroscopic examination were negative on 14 March and 8 September 1955. No murmur was heard and the patient's weight had increased from 146 to 155 pounds.

*Case 21* The patient was returned to duty 8 September 1954. His heart was negative; no murmur could be heard; the P-R interval was 0.16; the rate was 74; and the patient was asymptomatic. On follow-up examination 7 January 1956 there had been no recurrence—no murmur could be heard and the electrocardiographic, roentgenographic and physical and laboratory examination findings were all within normal limits. The patient had gained 10 pounds in weight.

*Case 22* This patient, a housewife, spent  $4\frac{1}{2}$  months in the hospital. Evidence of activity persisted until 15 January 1955. The murmurs were the same on 8 March 1955.

*Case 23* Electrocardiographic findings in this patient were normal and the P-R interval was 0.12. No murmur could be heard on the last examination, 14 October 1955.

*Case 24* The cortisone dosage for this patient was inadequate the first 4 months of his hospitalization. An apical systolic murmur became prominent and an apical diastolic murmur was heard intermittently through August 1955. Electrocardiographic findings were positive through September. The patient received cortisone therapy for  $8\frac{1}{2}$  months. Convalescence was uneventful through 45 days of physical reconditioning and the patient was discharged to duty 21 November 1955 with no restrictions. The last follow-up examination, 17 January 1956, showed recurrent slight stiffness in the right hip on strenuous exertion. The patient's pulse was 76; blood pressure 120/70 mm Hg; and a grade I-II systolic murmur was heard at the apex and base but no diastolic murmur was heard. The patient's weight had increased from 170 to 206 pounds.

*Case 25* This patient probably had an intercurrent infection in May for which he was adequately treated. No murmur was heard on repeated examinations after 20 May and the electrocardiographic findings remained normal. The patient was asymptomatic and all findings were within normal limits at his discharge to full duty, 17 October 1955.

*Case 26* This patient was asymptomatic after the first week of hospitalization and the systolic murmur was no longer heard after mid May. Convalescence and rehabilitation were uneventful and the patient was returned to full duty 21 October 1955 with all findings within normal limits. His weight had increased from 160 to 190 pounds.

*Case 27* This patient's course in the hospital was uneventful throughout his treatment. Systolic murmurs persisted through September. No murmurs were heard after mid October. He gained 10 pounds in weight. Examination was negative on his discharge to full duty, 10 November 1955. Penicillin by mouth was continued.

I have used cortisone since 1951 to relieve symptoms and suppress the inflammation of rheumatic fever, and the patients treated in 1951 were reported previously.<sup>4</sup> The first 12 patients reported herein were treated in a U S Army hospital in Japan—2 in the fall of 1952 and 10 during 1953. Some were admitted directly to the hospital and some were transferred from Korea or other medical installations where they had been on supportive therapy for varying periods of time. The last 25 patients were treated at this hospital during the period 1954-1956.

These patients were started on cortisone as soon after admission as the diagnosis was made. An antibiotic—penicillin, unless the patient was known to be allergic to it—was started at the same time, and in some cases prior to arriving at a definite diagnosis. In addition, each patient was placed on strict bed rest until the acute symptoms subsided, after which bathroom privileges were allowed. Hemtoret and sedimentation rate, antistreptolysin "O" titer, throat culture, and electrocardiographic studies of each patient were reported twice weekly during the early stages of the illness and weekly thereafter. Heart fluoroscopy and roentgenograms were done early and one or more times later. Routinely, potassium chloride, 3 grams daily in divided doses, was administered orally. Serum potassium levels, which were determined frequently, remained in the normal range. Each patient was seen daily by the same physician. All patients were examined once or twice weekly by me, and were seen at various times by a consultant in cardiology. Temperature and pulse were checked by the ward nurse or ward master two to four times daily, and graphic charts were kept. The values shown in the graphs are the highest daily recordings. For the pulse rate, this admittedly is a poor method, nevertheless, it affords a fair figure for comparison, since the ward personnel taking the pulse rates were unaware of more than routine emphasis.

The initial dose of cortisone was 300 to 400 mg, depending on the weight of the patient. The oral route was preferred because of the ease of administration, the rapidity of absorption, and minimal discomfort to the patient. The daily dose was given initially at six-hour intervals and then at eight hour intervals after the acute symptoms had subsided. For two patients weighing over 200 pounds, it was necessary to increase the dose to 500 mg daily before a remission in the various signs of disease activity could be obtained (cases 10 and 24).

The early concept was that suppression of positive signs of activity by the use of hormone therapy should be maintained throughout the active period of the disease. This was found to be practicable in all except two cases (9 and 11) who were evacuated to the United States of the t

of their periods of service. Both had developed chronic corticoidism and both had proloaged periods of activity—seven and eight months at the time of evacuation. In general the initial daily dose was continued until the patient was asymptomatic and the sedimentation rate, C reactive protein, and electrocardiogram had returned to normal. This was usually from 7 to 10 days but in some cases longer. As a rule, the temperature and pulse rate were near normal at this time, although from the graphs presented it will be noted that minor elevations in the temperature (usually in the afternoon or evening) and frequent elevations in the pulse rate at bed rest were recorded throughout the period of activity.

An attempt was then made to reduce the daily dose by 50 mg at four to seven day intervals to a daily dose of 200 to 300 mg depending on the size and weight of the patient. Based on previous experience it was believed that approximately 1 mg of cortisone per pound of weight was the minimal dose that would maintain any appreciable suppression of disease activity. To obtain adequate suppression approximately 15 mg of cortisone per pound of weight was the dosage goal for the first six to eight weeks of therapy. However, in cases 4, 6, 7, 8, 11, 14, 18, and 24 when fever symptoms elevated sedimentation rate, gallop rhythms or prolongation of the P-R interval recurred, the dose was increased above this level. After six to eight weeks on relatively high doses of cortisone and provided all findings indicated possible cessation of activity, the hormone was again decreased. This was accomplished by reducing the daily dose by 25 or 50 mg at three or four-day intervals to zero or until signs of recurring activity were noted. In that event the dose was again increased until these signs reverted to normal, and then the increased dosage was continued for several weeks longer after which the tapering off process was again attempted.

In general the results of this plan of therapy have been most encouraging. The temptation to reduce the dosage of hormone prematurely is great especially among medical officers using this method of treatment for the first time. This tendency must be constantly discouraged for best results. Case 4 is an example. This patient required repeated courses of cortisone, but after six months was successfully carried through his period of activity without demonstrable heart damage. It should be noted that cortisone was started early in the disease in this patient, when evidence of cardiac damage was limited to precordial pain and first degree heart block. Cases 1, 2, 19, 20, 21 and 28, 38 were treated promptly and the periods of activity were short. Case 16 was a nine year old child treated for five months with no residual cardiac damage evident after 13 months follow up. The other two children also recovered with no residuals after one year's follow up in one and six months' follow up in the other. Cases

9, 17, and 21 were treated for four, seven, and nine and a half months respectively, with recovery from apical diastolic murmurs that were heard frequently but later could not be heard by several internists and a consultant in cardiology. After prolonged treatment, a total of 23 patients (60.3 per cent) were left with no demonstrable heart damage, although carditis was evident in all before treatment.

Whether any of these patients would have sustained cardiac valvular damage had they been treated with salicylates can, of course, not be answered. In this series of patients, 33 of the 38 had significant murmurs. These disappeared in 19 patients (cases 9, 16, 17, 19, 21, 24-27, and 28-36) or 57.6 per cent (table 2). The importance of early diagnosis and initiation of hormone therapy is borne out by the finding that murmurs disappeared in 78.6 per cent of those starting treatment within the first week of hospitalization, as compared with 42.1 per cent of those starting treatment in the second week or later. The P-R interval was prolonged in 11 patients; it returned to normal and remained normal in all but one (case 12). Due to difficulty in diagnosis and reluctance on the part of the ward officer to use adequate suppressive doses sufficiently long, this patient was inadequately treated.

TABLE 2 Frequency of disappearance of murmurs at end of therapy

Interval between admission to hospital and beginning of therapy (days)	Patients with significant murmurs	Disappearance of murmurs	
		Number	Per cent
1 to 7	14	11	78.6
8 to 14	10	4	40.0
14 and over	9	4	44.4
Total	33	19	

Undesirable effects of hormone therapy were not too pronounced in this series of patients. Occasionally, indigestion was treated with antacids. Most to be feared is intercurrent infection. Only upper respiratory infections were encountered. The hypercortical features disappear a month or so after treatment is discontinued. Occasionally, purple striae appear and remain. The occasional elevation in blood pressure returns to normal within three or four weeks. The increase in appetite is remarkable and accounts for frequent gains in weight, requiring dietary restrictions. No instance of anemia persisting on hormone therapy was found.

#### DISCUSSION

To those of us who treat rheumatic fever and observe its sequelae, the knowledge of our limitations is still urgent

Physicians in the past have been keenly aware that, despite their greatest efforts success or failure in preventing death or cardiac disability was due in large part to whether there was (1) inflammatory involvement of the heart valves, (2) continued inflammatory activity in the myocardium, with resulting heart enlargement and failure, (3) inflammatory involvement of the neuromuscular tissue with varying degrees of heart block, occasional paroxysmal nodular tachycardia or auricular fibrillation, (4) prolonged duration of the attack with recurrences and continued activity or (5) no recurrence and no further activity. The prevention of the initial attack at present depends on the timely diagnosis and treatment of streptococcal infection in the susceptible individual. Prevention of future attacks in a known rheumatic individual is now considered possible. Successful immunization appears to be a hope of the future.

An understanding of the peculiar biochemical relationships between the beta hemolytic streptococcus and the rheumatic individual is still lacking. The concept of the immuno-allergic pathogenesis of rheumatic fever was recently enhanced by the work of Jellors and Ortega.<sup>4</sup> Their work, although specifically concerned with glomerulonephritis, disclosed a feature common to most collagen diseases, namely, the localization of gamma globulin at the site of the lesions. It is assumed that the gamma globulin serves, at least in part, as antibody against antigen that has localized at the site of the lesions. Since so much work has established the streptococcus as the producer of the antigenic substances, the old concept of auto-antibodies acting solely against an intrinsic tissue antigen can be discarded.

In patients with active disease and in those who have recovered from rheumatic fever, the importance of penicillin in preventing hemolytic streptococcal infections has been established without question. A regular prophylactic regimen or, as a lesser choice, the widespread prophylactic treatment of upper respiratory tract infections in known rheumatic fever patients with antibiotics or sulfonamides will doubtless prevent more valvular heart disease than the use of any form of therapy available for the acute attack.

Prior to 1952, acute rheumatic fever was treated with an initial short course of an antibiotic, usually penicillin. It has since been shown that penicillin or another suitable chemotherapeutic drug should be given initially in high dosage for 10 days to ensure the eradication of smoldering streptococcal infection.<sup>1, 10</sup> Treatment should then be continued in prophylactic dosage. In 1953 the American Rheumatism Association recommended that this prophylactic treatment be continued in all rheumatic children to the age of 18 years or for 5 years after an attack of rheumatic fever if this period overlaps or the attack occurs after the age

of eighteen.<sup>4</sup> Early in 1955 this recommendation was changed to lifetime administration of prophylactic penicillin.<sup>10</sup>

It has been my impression that physicians in general have been slow to put into operation this plan of specific prophylaxis. This hesitancy is probably due to the continuing campaign against the indiscriminate use of antibiotics and the many reports of complications of antibiotic therapy. Second in importance to the prevention of future attacks of rheumatic fever and their consequent cardiac damage is the possible prevention of subacute bacterial endocarditis. According to a recent report by Wallach, Lulash, and Angrist<sup>11</sup> dealing with children under 10 years of age dying of rheumatic heart disease, rheumatic activity is responsible for death in 92 per cent and heart failure resulting from mechanical impairment in 8 per cent. From age 10 through age 19, rheumatic activity causes 52 per cent of deaths, heart failure 12 per cent, and bacterial endocarditis 36 per cent. In later decades, rheumatic activity becomes progressively less important and heart failure more frequent as the cause of death. Bacterial endocarditis is of greater importance during the second through the fifth decades, being responsible for death in 36 per cent, 47 per cent, 39 per cent, and 29 per cent, respectively.

*Streptococcus viridans* is frequently cultured from the throats of patients on penicillin prophylaxis. Whether the blood level maintained by oral doses of penicillin or monthly injections of benzathine penicillin G is sufficient to prevent these organisms from becoming implanted in the heart valves has not been determined. This is analogous to the concept of prevention of beta hemolytic streptococcal infection. We occasionally culture these organisms from the throats of patients on prophylactic therapy, especially patients in the hospital wards who are receiving cortisone. However, the organisms do not establish a sustained infection with usual clinical manifestations and subsequent elevation of the antistreptococcal "O" titer.

It is well known that more intensive treatment is usually required to eradicate an established infection caused by either *S. viridans* or beta hemolytic streptococcus. The regimen of choice for prophylaxis is 169.3 mg (250,000 units) of potassium penicillin G on an empty stomach, 30 minutes before breakfast and at bedtime. After the patient leaves the hospital, the dosage may safely be reduced to 169.3 mg (250,000 units) once daily. Since the advent of long acting benzathine penicillin G, better control in many instances can be maintained by monthly injections of 990.9 mg (1,200,000 units). This is especially advantageous in hospitalized patients. While the patient is hospitalized, bi-monthly injections are preferred because of the increased likelihood of contact with carriers of streptococci. If the patient is sensitive to penicillin, 1 gram of sulfadiazine each may be used.

The really important question about the hormones in rheumatic fever is whether or not they will prevent valvular heart disease and other long term sequelae. We can reasonably conclude after many years of use that salicylates do not prevent a crippled heart. Salicylates do ameliorate the disease but even when used early in the acute attack valvular disease may still develop. It appears that the main difficulties with hormone therapy have been (1) the tendency to study or observe the patient too long before starting therapy (2) a hesitancy to use fully suppressive dosage and (3) the ever present tendency to discontinue treatment too early or to treat in "courses." There are good explanations for these failures. These include lack of sufficient data on which to make an early diagnosis, the fear of aggravating congestive failure and the reluctance to changing a patient into a pugy, acne spotted caricature of his former self. The difficulty in diagnosis of the atypical case cannot be overcome with present knowledge and laboratory help. Chief reliance is on experience, training and an acute awareness of rheumatic fever in the differential diagnosis.

In the severely ill patient especially in the first two decades of life steroids may often be lifesaving. In general hormones do not aggravate congestive failure for more than 24 hours or so. If improvement does not occur after 48 hours of treatment it usually means that the dosage is too small. However, if after the disease is controlled for a few days or a week or so the hormones are discontinued or reduced to ineffective levels, there is usually a prompt recurrence, often more severe than initially. This error in treatment of rheumatic carditis is frequent and grave. It leaves the suppressed adrenal glands unable to react at maximum capacity. Occasionally rapid deterioration and death ensue. These deaths are sometimes reported as treatment failures.<sup>12</sup> A low sodium diet, mercurial diuretics, digitalis, oxygen et cetera often are necessary in such patients during the early phase of therapy. Massell,<sup>6</sup> in reviewing 10 reports of patients with rheumatic carditis treated with hormones, found definite improvement of congestive failure in 75 per cent.

Since corticotropin (ACTH) and cortisone cause a retention of sodium and water the rapid clearing of signs of congestive failure in my experience is good evidence that the inflammatory process in the myocardium is controlled. Further evidence is the control of gallop rhythm and tachycardia (cases 10 and 12) although the latter often is incompletely controlled until the period of activity is over. Although the patient may be on a seemingly suppressive dosage in many instances throughout the period of activity turning him in bed or having him sit up is sufficient to produce an abnormal increase in pulse rate. Pericarditis usually clears in a few days as manifested by disappearance of a friction rub. Electrocardiographic changes may take longer.

especially S T segment elevations and T-wave changes. Some of these T wave changes are considered to be due to serum potassium fluctuation. The P R interval, unless it is a fixed prolongation from previous cardiacs, has returned promptly to normal, in my experience. In some patients the disease cannot be adequately suppressed even with maximum doses of cortisone. However, with this type of patient, it is my belief that it is even more important to continue the cortisone, even though it only partially suppresses the disease. This may prevent severe damage and possibly a fatal outcome during a fulminating course.

The main question of preventing chronic valvular heart disease has not been settled yet. Authors appear to be reluctant to give an opinion on this. One reason for this reluctance is the fact that most patients with recurrent attacks already have valvular damage when seen. New patients often have murmurs when first seen, or develop murmurs prior to starting treatment or prior to being given a definite diagnosis of rheumatic fever. The changing character of murmurs in acute rheumatic endocarditis is well known. However, after carefully observing and treating patients for the past six years with this question in mind, I am convinced that the progression of valvular damage ceases with the suppression of inflammation by adequate hormone therapy. In general, existing murmurs remain the same or become less pronounced during adequate treatment. On adequate suppressive therapy throughout the period of activity, murmurs, both systolic and diastolic, frequently disappear permanently. If no murmur is present prior to treatment, the patient does not develop one except occasionally in fulminating cases during the first few days before suppressive therapy is effective.

The recent work of Roy and Massell<sup>13</sup> showed disappearance of significant murmurs in 40 per cent of 66 patients. Disappearance of murmurs was twice as common in 47 rheumatic children treated with large doses of cortisone (150 mg daily for an average of 14 weeks) as in a comparable group of 41 children treated with smaller doses (100 mg daily for an average of six weeks). Coste and Oury,<sup>14</sup> in a report of 43 cases, did not see signs of carditis after 48 hours' treatment, if patients were started on hormone therapy before signs of carditis appeared or were started on such therapy in the early stages of carditis. Apparent exceptions to the above will be seen, but if a search is made one will find either inadequate treatment in dosage or duration of hormone therapy, or the likelihood of recurrence of a streptococcal infection in a patient not protected by prophylactic therapy.

The impression gained from clinical observation is that hormone therapy does not shorten the duration of the disease. It is not intended to imply that short treatment is reasonable to expect that the



pronounced in the early acute febrile stage. The proliferation of the valvular endocardial and subendocardial cells, often in palisade arrangements with swelling of the interstitial connective tissue and a dense leukocytic infiltration, occurs early during the exudative and proliferative phases of the disease. If this process can be prevented or interrupted in its initial stage, the thickening, fusion and retraction of valve leaflets that occur repeatedly with each new episode of rheumatic fever can be curtailed. The extent of curtailment depends on variables such as the severity of the process in a particular patient and the adequacy of the hormone dosage administered. The same can be said for the involvement of the myocardium.

The characteristic Aschoff's body is the inflammatory lesion incriminated by pathologists to account for acute dilatation and heart failure. Furthermore, congestive heart failure occurring in the course of chronic valvular heart disease is now considered to be due to reactivation or continued activity of myocarditis. Murphy<sup>45</sup> has demonstrated that these Aschoff's bodies develop in and from injured myofibers that are being necrotized. The intimal and medial changes in small arteries supplying the auriculoventricular conductive tissue as well as the edema and infiltration with polymorphonuclear cells, lymphocytes and plasma cells of this tissue probably account for the irregularities and heart block that appear temporarily. Whether this is true or whether the Aschoff's body is responsible remains to be established. The Aschoff's body is peculiar to the myocardium and does not appear in the inflammatory valvulitis, endocarditis, or pericarditis of rheumatic fever.

Finally, it is necessary to adopt a concept of management of rheumatic fever similar in many ways to that of tuberculosis. This is especially true in the Armed Forces. The military patient must be hospitalized throughout his illness and convalescence. Children and other dependents need hospital care for relatively short periods when hormone suppression is used. After the acute symptoms and signs in the rheumatic child are normal, strict bed rest is neither practical nor desirable. Supervision by a parent at home with weekly office visits has proved a most satisfactory practice.

#### SUMMARY

The results of treatment with cortisone of 38 patients with acute rheumatic carditis are reported. Treatment was continued in sufficient dosage to suppress the rheumatic activity throughout the period of immuno-allergic reaction in all but two patients.

Twenty-three of the 38 patients (60.5 per cent) were left with no evidence of heart damage. Thirty-three patients had significant murmurs. In 19 (57.8 per cent) these disappeared during treatment and remained absent throughout the follow-up period.

All patients were treated with chemotherapeutic drugs in therapeutic dosage early, and in prophylactic dosage thereafter. No recurrences of rheumatic fever were apparent.

## REFERENCES

- 1 Committee of the American Rheumatism Association. Primer on the rheumatic diseases: rheumatic fever. *J. A. M. A.* 152: 326-331, May 23, 1953.
- 2 McCarthy M. In Thomas L (editor). *Rheumatic Fever*. University of Minnesota Press, Minneapolis, Minn., 1952, pp. 61-71.
- 3 Massell B F, Sturgis G P, Frohlock J D, Steeper R B, Hall T A and Norcross P. Prevention of rheumatic fever by prompt penicillin therapy of hemolytic streptococcal respiratory infections: progress report. *J. A. M. A.* 146: 1469-1474, Aug. 18, 1951.
- 4 Bernstein S H, Feldman H A, Harper O F Jr and Allagansmith, W H. Mass oral penicillin prophylaxis to control of streptococcal disease. *A. M. A. Arch. Int. Med.* 93: 894-898, June 1954.
- 5 Elghamret H W. Prevention and treatment of rheumatic fever. *Illinois M. J.* 104: 187-189, Sept. 1953.
- 6 Gibson H C, Spivey D V, Clifford T C and Oppenheim D J. Effects of cortisone on acute rheumatic carditis. *U. S. Armed Forces M. J.* 4: 295-304, Feb. 1953.
- 7 Cortisone or corticotropin in rheumatic fever (Queries and Minor Notes section). *J. A. M. A.* 152: 1493, Aug. 8, 1953.
- 8 Massell B F. ACTH and cortisone therapy of rheumatic fever and rheumatic carditis (Medical Progress section). *New England J. Med.* 251: 221-228, Aug. 5, 1954.
- 9 Melfors R C. and Ortesa L G. Analytical pathology: new observations on pathogenesis of glomerulonephritis, lipid nephrosis, periarthritis nodosa and secondary amyloidosis in man. *Am. J. Path.* 32: 455-499, May-June 1956.
- 10 Committee on Prevention of Rheumatic Fever and Bacterial Endocarditis of the American Heart Association. Prevention of rheumatic fever and bacterial endocarditis through control of streptococcal infections. *Circulation* 11: 317-320, Feb. 1955.
- 11 Wallach J B, Lukash L and Angrist A A. Mechanism of death in rheumatic heart disease in different age periods. *Am. J. Clin. Path.* 26: 360-367, Apr. 1956.
- 12 Chamberlain E A, Hay J D and Freeman D M. Cortisone in rheumatic carditis: some preliminary observations. *Brit. M. J.* 1: 1145-1152, May 31, 1952.
- 13 Roy S B and Massell B F. Comparison of large and small doses of hormones in treatment of acute rheumatic carditis. *Circulation* 14: 44-47, July 1956.
- 14 Coste F and Outy M. Traitement de la maladie de Bouillaud par la cortisone et l'ACTH. *Presse med.* 59: 1493-1496, Nov. 14, 1951.
- 15 Murphy G E. In Thomas L (editor). *Rheumatic Fever*. University of Minnesota Press, Minneapolis, Minn., 1952, pp. 30-31.

# A NEW OVERHEAD ANESTHETIC PANEL FOR PIPED GASES, VACUUM, AND ELECTRIC OUTLETS

JAMES B BUTLER *Captain MC USN*

FRANK MOYA *Lieutenant MC USNR*

JOHN S. LUNDY *M. D.*

**I**N THE PAST three decades great strides have been made in the field of anesthesiology. One of these advances was the introduction at the University of Wisconsin of the first central gas piping system.<sup>1</sup> Since that time the practice of central piping spread to other hospitals throughout the country and the techniques and equipment have been perfected so that today there is a high degree of safety, efficiency, and economy. One problem that still remains in the operating room area, however, is the handling of the high pressure rubber tubing connecting the gas machine to the outlet.

Several attempts have been made to overcome this problem by the use of wells or "islands" beneath the table, suspension from the ceiling or wall by means of arms or overhead cranes, and suspension poles that extend from the floor to the ceiling. These all have the disadvantage of being cumbersome and usually still leave the tubing hanging at dangerously low levels.

Another problem in the modern operating room is that of the steadily increasing need for more electric connections. This stems from the anesthesiologist's greater utilization of electronic instruments in helping him keep track of the patient's condition. In addition to these monitoring devices the advent of intra-cardiac surgery with pump oxygenators requires even more electric outlets conveniently placed. This introduces the hazard of electric cords strewn about the operating room where they can be stepped on, worn, frayed, or unplugged by people walking about.

In planning the operating rooms of the new U. S. Naval Hospital at Great Lakes III, it was decided after much consideration and consultation that the use of a fixed overhead panel

---

From U. S. Naval Hospital at Great Lakes III and Navy Foundation, Rochester, Minn.

for piped gases, vacuum, and electric outlet would most likely solve the above problems.

As shown in figure 1, the panel consists of a stainless steel housing about 28 inches long and 9 inches wide, fastened directly to the ceiling construction over and behind the position of the gas machine. At the lower end of the panel are outlets for oxygen, nitrous oxide, and vacuum. The lines are connected to their respective hoses with noninterchangeable connectors. At each end of the panel there is a duplex, explosion-proof electric outlet.

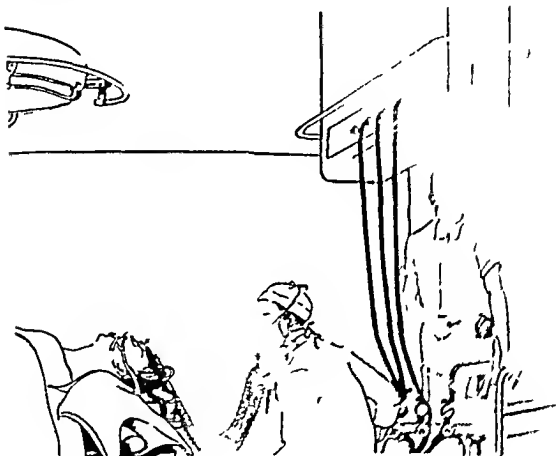


Figure 1 Overhead utility

There is a stainless steel panel about 28 inches from the bottom of the chair which can be suspended or it can be fixed to the wall.

The lowest part of the panel, this being a stainless steel panel, is enough to be hazardous rounded at the bottom.

We have briefly described the overhead utility panel for piped gases,

and it will be a great help to the dentist during an emergency. The panel is fastened to the ceiling with a rubber band.

panel is a stainless steel panel. It is a great help to the dentist during an emergency.

panel is a stainless steel panel.

the panel is a stainless steel panel.



# EFFECT OF PROCLORPERAZINE ON PSYCHOLOGIC, PSYCHOMOTOR, AND MUSCULAR PERFORMANCE

FRED B BENJAMIN D M D Ph D

KIMIO IKAI, M D

HENRY F CLARK B A

**D**URING recent years, tranquilizing agents have gained great prominence in clinical practice. As Brucke<sup>1</sup> pointed out, however, these drugs possess an almost infinite number of properties. This raises the problem of the nature of various effects produced and their relation to the tranquilizing effect. The investigation herein reported approached this problem by using one drug and one dose level in a great variety of tests.

## MATERIALS AND METHODS

The drug used was Compazine (brand of prochlorperazine) which is an analog of chlorpromazine. The dose was 10 mg. This produces a marked tranquilizing effect without interfering with the normal daily activities of the subject. The only side effect that might be expected is a slight somnolence. In order to differentiate between the true tranquilizing effect of the drug and this side effect, one control group was given not a pure placebo, but 10 mg of phenobarbital. A second control group received no drug.

The experiments were divided into three groups: (1) 10 mg of prochlorperazine was given by mouth one hour before the start of the experiment, (2) 10 mg of phenobarbital was given by mouth one hour before the start of the experiment, (3) no medication was given. The drugs were supplied under code number, so that neither the subject nor the experimenter knew which drug was being tested.

Fifteen men, 20 to 43 years of age and with no known clinical disturbances, were chosen as subjects. Six of these subjects served for two series of experiments. Each subject was tested under the three experimental conditions, and for each

---

From University of Pennsylvania School of Medicine, Philadelphia, Pa., and the Aviation Medical Acceleration Laboratory, U. S. Naval Air Development Center, Johnsville, Pa.

tical evaluation each subject served as his own control. In order to eliminate as far as possible any effect of environmental conditions such as room temperature, noise level, and time of day, three subjects were always tested simultaneously, one under each of the three possible experimental conditions.

The following tests were used as an indication of psychologic, psychomotor, and muscular performance.

#### **Mental Performance**

*Memory of numbers.* Numbers were given, increasing from four to nine digits, and the subject had to write them down after a short interval. This test was analyzed as to the maximum span achieved and the total number of mistakes.

*Crossing "E."* All E's on a page of printed material had to be crossed out. This test was analyzed for the number of lines attempted within the 3 minute test period and for the number of mistakes and omissions.

*Code substitution.* Three lines were given, and the fourth one had to be filled in. The first line consisted of the letters of the alphabet arranged in correct order. In the second line, numbers were given in random order corresponding to each letter of the first line. The third line gave an arbitrary combination of letters, and the corresponding numbers had to be filled in from the code given in the upper two lines.

#### **Time Perception**

*Free time estimate.* The subject had to estimate an interval of one minute and the actual time was recorded.

*Tapping.* The subject was asked to tap out 60 seconds on a Veeder Root counter, and the actual time was recorded.

#### **Reaction Time**

*Simple reaction time.* A 360-millisecond time clock was arranged with two interruption switches. The operator started the clock with a click. The subject when hearing the click, had to stop it as soon as possible by pressing his switch.

*Choice reaction time.* The same arrangement as in simple reaction time was used, however this time the subject was told to respond only to one of two sounds of slightly different frequencies. The reaction time and the number of false responses were recorded.

#### **Reflex Activity**

Patellar reflex was determined by having a percussion hammer suspended in such a manner that on release it hit the tendon with controlled force. The movement of the leg was registered

by fixing a string to the heel. This movement was converted into vertical deflection and the amplitude was recorded on a kymograph.

### Pain Threshold

The volar side of the forearm was painted with India ink to assure maximum heat absorption. Initial skin temperature was determined with a radiometer. The arm was then exposed to a known amount of radiant heat ( $200 \text{ mW/sec/cm}^2$ ) and the time was recorded when the subject reported the first pricking pain.<sup>2</sup> The final skin temperature was then calculated from Buettner's<sup>3</sup> formula.

### Hearing Impairment

Hearing loss was determined with a Maico audiometer for 250, 1,000, and 6,000 cycles per second. The three values for hearing loss were combined to give one value for hearing impairment.<sup>4</sup>

### Muscular Co-ordination

**Punchboard** A plastic board had three holes arranged as a unilateral triangle with a side length of 4 inches. A metal stylus fitted the holes and a shoulder stopped the punch at a depth of  $3/16$  inch. The subject was asked to punch the three holes in sequence as rapidly as possible. The number of punches for a 3 minute period were counted.

**Rotary pursuit device** The subject had to follow with a stylus an irregular line on a rotating kymograph. The mistakes were automatically recorded on an Esterline Angus armeter. Any aberration caused a deflection, and the time of aberration determined the amplitude of the deflection. The results were analyzed as to the number of mistakes and as to the product of the number of mistakes and magnitude of deviation read in the arbitrary line units of the recording instrument.

### Muscular Performance

The heart rate, respiratory rate, respiratory minute volume, and oxygen concentration of expired air were determined, after which the changes in these values were observed during a 10-minute period of exercise and during 4 minutes of recovery. An ergometer bicycle with a wheel circumference of 1.96 meters was used. The resistance was 4 pounds, and the rate of revolution was fixed with a metronome at 40 revolutions per minute. Heart rate was determined with an electrocardiograph. Respiratory measurements were made with a Hutchinson respirometer. For the oxygen analysis, a Beckman model D oxygen analyzer was used. Data were collected immediately before exercise, 3 minutes after the start of exercise, 8 minutes after the start of exercise, and 3 minutes after the end of exercise. All experiments



were analysed as an individual comparison, taking each subject as his own control

## RESULTS AND DISCUSSION

Results 1 to 6 in table 1 give data on tests primarily involving mental performance. The differences for any single test are not significant but if the number of mistakes for crossing "E" (result 4) are combined with those of the code substitution test (result 5), the difference between the prochlorperazine and no drug groups is significant ( $p=0.05$ ). Such a combination may be justified, as the two tests show a good correlation ( $r=0.65$ ), however, this change may not be specific inasmuch as the phenobarbital group shows the same trend.

Time perception (results 7 to 11) was not affected by either of the drugs and if simple reaction time and choice reaction time are considered separately there also is no significant change. If the two are combined ( $r=0.53$ ), however, there is a significant drug effect that appears to be specific to the prochlorperazine group.

The initial skin temperature was slightly higher in the group using prochlorperazine (result 12) but the difference is not significant. In view of the known vasodilator action of such drugs,<sup>11</sup> however, this difference might be significant with a higher dose. There was no change in the pain threshold (result 13) and no impairment of hearing (result 14). The amplitude of the patellar reflex (result 15) was decreased in the prochlorperazine group, whereas phenobarbital had no effect. In tests primarily involving muscular coordination (results 16 to 18) there was inhibition in the prochlorperazine group. The differences are not all significant but the trend is the same in all tests.

On the whole there appears to be very little effect in tests primarily involving mental function whereas those tests largely involving muscular activity show impairment. To further elucidate this point the effect of prochlorperazine on muscular exercise was determined. Table 2 shows that in the pre exercise period there was no significant difference between groups. During exercise the only changes were increase of pulse rate and oxygen consumption in the prochlorperazine group. The differences were slight, and they become significant only if the 3 and 8 minute periods are combined.

In the postexercise period there was a change in pulse rate and oxygen consumption in the same direction as during exercise however the differences were not significant. The increased heart rate and the increased oxygen consumption for the prochlorperazine group during exercise indicate a decreased efficiency of work performance as confirmed by calculated efficiency values. An inhibition of muscular efficiency also is sup-

TABLE 1 Effect on psychologic and psychomotor performance of 10 mg prochlorperazine compared with 10 mg phenobarbital and with no medication

Result Number	Type of test	Number of		Group			t values	
		Subjects	Tests	Prochlorperazine	Phenobarbital	No drug	Prochlorperazine-Phenobarbital	Prochlorperazine-no drug
1	Memory (span)	21	63	6.2	6.3	6.3		
2	Memory (mistakes)	21	63	6.4	5.8	7.4		
3	Crossing I" (linea)	24	72	39.6	39.3	39.2		
4	Crossing I (mistakes)	24	72	1.2	3.7	2.7	}	0.05
5	Code-substitution (mistakes)	24	72	0.42	0.40	0.29		
6	Code substitution (time sec)	24	72	179.1	179.3	179.0		
7	Time tapping (60 sec)	24	72	61.7	60.0	59.7		
8	Time estimate (1 minute)	24	72	70.0	70.6	69.7		
9	Simple reaction time	24	720	176	171	169	}	0.05
10	Choice reaction time (time)	24	720	254	251	251		
11	Choice reaction time (mistakes)	24	720	2.00	1.63	1.83		
12	Skin temperature (°C)	24	72	33.7	33.4	33.3		
13	Pain threshold (°C)	20	180	45.4	45.8	45.7		
14	Hearing impairment (%)	24	72	3.4	3.5	3.4		
15	Patellar reflex (amplitude mm)	24	72	31.8	35.4	36.6	0.05	0.01
16	Punchboard (no / 3 min)	24	72	109	112	111		
17	Rotary pursuit (dev)	24	72	6.8	4.8	4.8	0.05	
18	Rotary pursuit (units)	24	72	29.2	17.5	18.1	0.05	0.06

TABLE 2 *Effect on muscular performance of 10 mg prochlorperazine compared with 10 mg phenobarbital and with no medication*

	Group			P values	
	Prochlorperazine	Phenobarbital	No drug	Prochlorperazine Phenobarbital	Prochlorperazine no drug
<i>Pre-exercise</i>					
Pulse rate	73.9	74.3	74.8		
Respiratory rate	11.7	11.6	11.6		
Tidal volume (ml)	1075	1034	1053		
Respiratory minute volume (l)	12.08	11.99	11.89		
O <sub>2</sub> concentration (%)	16.95	16.96	16.94		
O <sub>2</sub> consumption (ml/min)	489	484	483		
<i>Exercise (3 and 8 minutes per day)</i>					
Pulse rate	112.1 112.9	111.9 112.0	108.3 109.8		0.05
Respiratory rate	14.8 15.0	15.2 15.8	15.0 15.3		
Tidal volume (ml)	1767 1764	1607 1669	1701 1750		
Respiratory minute volume (l)	26.16 26.64	24.42 26.37	25.52 26.78		
O <sub>2</sub> concentration (%)	15.31 15.24	15.30 15.38	15.44 15.48		
O <sub>2</sub> consumption (ml/min)	1489 1524	139 148	1419 1479	0.05	0.05
<i>Post-exercise (3 minutes after end of exercise)</i>					
Pulse rate	86.2	84.3	83.8		
Respiratory rate	11.8	11.9	11.9		
Tidal volume (ml)	948	957	945		
Respiratory minute volume (l)	11.18	11.29	11.24		
O <sub>2</sub> concentration (%)	16.91	17.16	17.11		
O <sub>2</sub> consumption (ml/min)	457	434	437		

ported by the fact that in 7 runs out of 24 the subjects taking prochlorperazine volunteered the information that they found the work tiring, while no similar reports were made in the other groups.

In the clinical use of chlorpromazine, one of the side effects is parkinsonism, which occurs in about 10 per cent of all patients under intensive treatment.<sup>7,8</sup> The present investigation indicates that there is inhibition of muscular performance even with very low doses of prochlorperazine, as shown by the increased reaction time, the decreased amplitude of the patellar reflex, the decreased performance in tests of muscular coordination, and the decreased efficiency in muscular exercise. Inasmuch as the patellar reflex is a spinal reflex, central depression would tend to increase the response. A decreased reflex activity might be an indication that the site of drug action is peripheral rather than central. The investigations of Courvoisier and associates<sup>9</sup> and Archer<sup>10</sup> support such an interpretation. Dasgupta and Werner<sup>11</sup> thought that there is muscular inhibition and that it is due to depression of the reticular formation, but their experimental findings do not contradict a peripheral drug action. Darberg and Houghs<sup>12</sup> did not find any change in the muscle action potential, but it is difficult to draw any conclusions from a negative experiment.

We must be careful not to generalize these findings, as only one of the tranquilizing agents was used in this investigation and we do not know whether other agents produce the same effects. Some of the effects probably would be more clearly revealed if various dose levels of the drug were used; however, a dose sufficiently high to give a dose response curve might interfere with the daily activities of the subjects. Finally, we do not know to what extent clinically disturbed patients would show the same reactions as the normal subjects used in these experiments.

### SUMMARY

The effect of 10 mg of Compazine (brand of prochlorperazine) was compared with that of 10 mg of phenobarbital and with that of no drugs, in a series of double blind tests, using 18 subjects. Tests of hearing and pain perception and tests primarily involving mental performance did not show any specific changes. Tests involving muscular coordination, however, showed a lower performance, and tests of muscular exercise showed a decreased efficiency.

### REFERENCES

1. Brücke F. Actions of chlorpromazine on central nervous system. In *Abstracts of Reviews of Reports*. 20th International Physiological Congress. Brussels. Aug 4 1956. pp 465-479.

- 2 Hardy J D Wolff H G and Good H H *Pain Sensations and Reactions* Williams & Wilkin Co Baltimore Md 1952 pp 297-297
- 3 Bettler A Effects of extreme heat and cold on human analysis of temperature changes caused by different kinds of heat application *J Appl Physiol* 3 691-702 June 1951
- 4 Benjamin F B Effect of pain on simultaneous perception of a painful sensory stimulation *J Appl Physiol* 8 630-634 May 1956
- 5 Foster C A O'Mullan E J Gaskell P Churchill-Davidson H C Chlorpromazine study of its action on circulation in man *Lancet* 2 614-617 Sept 25 1954
- 6 Dundee J W Meshkinpour P R and Scott W E Chlorpromazine and products of hypothermia *Anesthesia* 9 296-302 Oct 1954
- 7 Schlichter W Bristow M E Schulz S and Henderson A L Siles occurring during intranasal chlorpromazine therapy *Canad. M. A. J* 74 364-366 Mar 1956
- 8 Hay P H and Voegtli G E Parkinsonian reactions following chlorpromazine and reserpine similar reactions in some patients *A. M. A. Arch. Neurol. & Psychiat.* 75 522-524 May 1956
- 9 Courvoisier S and others Propriete pharmacodynamique du chlorhydrate de chloro-3 (dimerhylmethylpropyl)-10 phosphan (4560 R P) etude experimentale d'un nouveau corps utilise dans la theorie potentialisee et dans l'hibernation artificielle *Arch. internat. pharmacodyn.* 92 305-361 Jan 1 1953
- 10 Archer J D Effect of chlorpromazine on morphine performance of rats *Fed. Proc* 13 332 Mar 1954
- 11 Dugrout S R and Vernet G Inhibitory action of chlorpromazine on motor activity *Arch. internat. pharmacodyn.* 100 409-417 Jan 1 1955
- 12 Dyrberg V and Huse W Interaction of chlorpromazine and muscle relaxants *1st Int. Communications 20th Int. Conf. Physiol. Congres. Brussel Aug 4 1956* p 443

### CORONARY DISEASE AND RACE

The death rates from coronary disease during the past 15 years have increased much faster among nonwhites than among white persons. Much of this may reflect the increasing exposure of the nonwhite population to modern medicine as a result of large scale migration from the rural South to northern cities."

—Statistical Bulletin  
Metropolitan Life Insurance Co  
p 2 Feb 1957

# WEEVER STINGS AND THEIR MEDICAL MANAGEMENT

BRUCE F. HALSTEAD Lieutenant MC USNR

**M**LAIBERS of the piscine family Trachinidae, the weevers, probably are the most venomous of temperate zone marine fishes. Trachinids are largely confined to the eastern Atlantic and Mediterranean coasts. They are relatively small fishes, the largest of which *Trachinus draco*, is not known to exceed a total length of 18 inches.

Weevers are primarily inhabitants of flat, sandy, or muddy bays. During the spring and early summer, they migrate into shallow waters to spawn. Trachinids have the habit of burrowing in the soft sand or mud, with only their heads partially exposed, and darting out at their prey. Despite their sedentary habits, weevers can move with great rapidity and are said to be able to strike an object with their opercular stings with unerring accuracy. Because of their habit of concealment, aggressive attitude, and highly developed venom apparatus, they constitute a hazard of which shallow-water divers, fishermen, and swimmers should be aware. Weaver stings may be extremely painful and on occasion may cause death.

The four species of weevers and their distribution are as follows:

*Trachinus araneus* Cuvier (fig. 1), Portugal, Mediterranean Sea, southward along the Atlantic coast of North Africa.

*Trachinus draco* Linnaeus (fig. 2), Norway, British Isles, southward to Mediterranean Sea, and coasts of North Africa.

*Trachinus radiatus* Cuvier (fig. 3), Mediterranean Sea, southward along the west coast of Africa.

*Trachinus vipera* Cuvier (fig. 4), North Sea, southward along the coast of Europe, and Mediterranean Sea.

---

From U. S. Naval Medical School, National Naval Medical Center, Bethesda, Md.

This investigation was aided by a contract payment to the School of Tropical and Preventive Medicine, College of Medical Evangelists, Loma Linda, Calif., from the School of Aviation Medicine, USAF Randolph Air Force Base, Tex., and a grant from the U. S. Public Health Service.

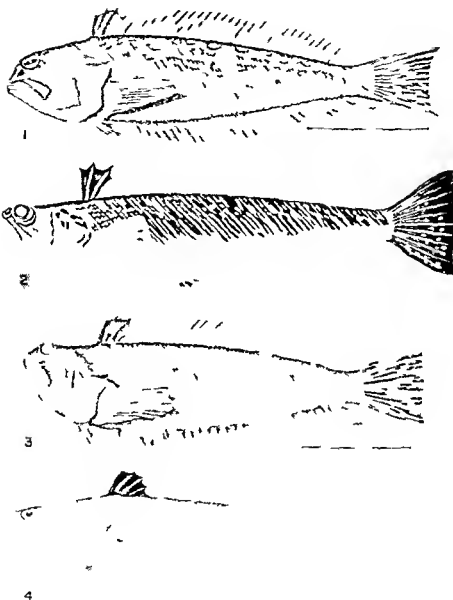


Figure 1 *Trachinus araneus* Cuvier (Courtesy of Smithsonian Institution.)  
 Figure 2 *Trachinus draco* Linnaeus Figure 3 *Trachinus radiatus* Cuvier  
 (Courtesy of Smithsonian Institution) Figure 4. *Trachinus vipera* Cuvier

Weevers have been given a great variety of vernacular names. Some of the more common ones are sandeel bill, sandeel fish, stingbull, mor wiber fawr, adder pike, black fin, stinister stang, stinger, spider, sea dragon (England), araneus, drece draeuneulus, tragiæ (Ancient Latin) fibersing, foersing, (Sweden) fjärsing, fjärsing, (Denmark), petermännchen, drachenfisch, schwertfisch, raiao (Germany), pietermann, pieterisch, zand meelna, stekelvisch, stokeltjo, pukkelt, pukkeling, pukkelpuikelsnr (Holland), vive, avive, arngann, iragan, iapourichin bois de roc, boudereux, toget, claquedit (France), arnna, escorpion (Spain), joh, zan, zanja, zanjea, dra-anja, taratn (Yugoslavin), drakniar (Greece) lomole, abo, and nbokor (Gold Coast).

The venom apparatus of weevers consists of five to seven dorsal spines, an opercular spine on each side of the head, and the associated venom glands (fig. 5). The glands of both the



Figure 5 Photograph of a lateral view of the opercular sting of *Trachinus vipera*. The integumentary sheath has been removed to reveal the underlying glands.

opercular and dorsal stings consist of masses of large, polygonal, variable sized, distended, light pink cells, filled with finely granular secretion (fig. 6). A detailed morphologic description of this venom apparatus is being published elsewhere.<sup>1</sup>

Wounds usually are received while wading with bare feet in sandy areas inhabited by weevers. Stings from *Trachinus draco*



the deep water species most commonly occur among fishermen in attempting to remove them from their nets. Because of the danger of stings from dead fishes, some of the towns in France have passed police regulations making it illegal to sell weevers without first cutting off their stings.



Figure 6. Longitudinal section of the opercular sting of *Trachinus vipera*. ( $\times 140$ )

### CLINICAL CHARACTERISTICS OF STINGS

Weever wounds generally produce instantaneous pain, described as a burning, stabbing or crushing sensation that initially is confined to the area about the wound and then gradually radiates throughout the affected limb. The pain becomes progressively more severe until it attains an excruciating peak usually within 30 minutes or less. The severity of the pain is such that the victim frequently screams in agony, thrashes about wildly, and may lose consciousness. Bourienne<sup>2</sup> reported a case in which the pain was so violent that the individual finally amputated his finger thereby obtaining prompt relief. Evans<sup>3</sup> mentioned fishermen hammering their fingers with a tbole pin and others wrapping the wound with vinegar soaked paper and lighting the paper in a desperate effort to deaden the pain. In most reported instances morphine fails to give relief. If untreated the pain usually subsides within a period of 2 to 24 hours.

Tingling, followed by numbness, subsequently develop the area about the wound. This is soon followed by redness, heat, and swelling. The edema is progressive, and within a half hour or more the entire limb is involved. Movement of the affected part is greatly restricted. The swelling may continue for a period of 10 days or longer. These initial symptoms of pain and inflammation may be associated with or followed by headache, fever, chills, delirium, nausea, vomiting, syncope, sweating, cyanosis, joint aches, ankylosis, aphonia, torpidity, cardiac palpitation, bradycardia, pronounced psychotic depression, respiratory distress, clonic or tonic convulsions, and death. Primary shock is a usual complication that must be guarded against, and secondary infections commonly occur in improperly treated cases. Lymphangitis, lymphadenitis, pyogenesis, and necrosis and sloughing of the tissue about the wound are not infrequent. Gangrene may develop, necessitating amputation.

The recovery period is extremely variable. Depending on the individual, amount of venom injected, species of weever, season of the year, and possibly the locality, the period varies from a few days to several months. In 1885, Bottari<sup>3</sup> reported a case which was complicated by a severe secondary infection that resulted in atrophy of the index finger, peripheral neuritis, and ankylosis. More than three years later the patient still was unable to touch an object with the affected finger without severe pain. De Marco<sup>4</sup> presented an interesting case of a 15-year-old boy in whom a weever sting on one of his fingers appeared to have stimulated a generalized epileptiform attack, and concluded that the venom acts as a cortical sensory motor stimulant. Additional clinical reports have been written by Gressin,<sup>5</sup> Coutiere,<sup>6</sup> Plancha,<sup>7</sup> and Grunio.<sup>8</sup>

#### CASE REPORT

On 24 July 1955 a 31-year-old Austrian zoologist was skin-diving about 200 meters off the Port of St. Angelo Ischia Island near Naples, Italy, at a depth of about 6 meters in the vicinity of a sand bank. In diving to the bottom he observed an unusually large weever, believed to be *Trachinus vipera*, lying partially buried in the sand. The fish did not appear to be disturbed by the intrusion and permitted him to touch it. Then suddenly it moved through the sand in a snake-like fashion and quickly turned facing the diver with fins vibrating in a most aggressive manner. Before he was able to withdraw the weever darted at him and struck at him twice, the first time striking only his face mask and then his right jaw.

Initially the wound bled profusely but without pain. This soon was followed by a stinging sensation not unlike that of a bee sting and the bleeding ceased. The pain rapidly increased in intensity and

the deep water species, most commonly occur among fishermen in attempting to remove them from their nets. Because of the danger of stings from dead fishes some of the towns in France have passed police regulations making it illegal to sell weevers without first cutting off their stings.



Figure 6. Longitudinal section of the opercular sting of *Trachinus vipera*. (x 140)

#### CLINICAL CHARACTERISTICS OF STINGS

Weever wounds generally produce instantaneous pain described as a burning, stabbing or crushing sensation that initially is confined to the area about the wound and then gradually radiates throughout the affected limb. The pain becomes progressively more severe until it attains an excruciating peak, usually within 30 minutes or less. The severity of the pain is such that the victim frequently screams in agony, thrashes about wildly, and may lose consciousness. Bourienne<sup>2</sup> reported a case in which the pain was so violent that the individual finally amputated his finger thereby obtaining prompt relief. Evans<sup>3</sup> mentioned fishermen hammering their fingers with a thole pin and others wrapping the wound with vinegar soaked paper and lighting the paper in a desperate effort to deaden the pain. In most reported instances morphine fails to give relief. If untreated the pain usually subsides within a period of 2 to 24 hours.

phils and plasma cells, none. The lymphocytes showed no toxic stimulation. Specific gravity of the urine was 1.028 and urobilinogen was normal. There were no other findings of significance.



*Figure 7. Appearance of patient who had been stung by a weever believed to be *Trachinus vipera*. Note edematous areas and extravasation of blood into tissues.*

**Family History.** The patient had a brother who died at the age of 14 years supposedly of hemophilia and he himself had a number of hemorrhages as a boy for which he was treated with vitamin-K therapy. He had had no recent hemorrhages.

took the form of a severe neuralgic pain involving the head and upper part of the chest. It became so severe that movement in the water was increasingly difficult but the diver finally managed to reach shore.

After about 15 minutes respiration became difficult and effort was required in order to continue breathing. The respiratory distress was relieved after about 10 minutes. The victim then noted that his ability to observe people's actions and voices was somewhat dulled; their movement and speech seemed to be greatly retarded. The injured side of his face gradually became inflamed although the actual wound site was only pinpoint in size.

The pain became unbearably intense and radiated outward from the jaw to involve all of the head and most of the chest. The victim groaned with the extreme pain and requested that someone shoot him and put him out of his misery. Upon the arrival of a physician he was given an injection of meperidine hydrochloride (amount not stated), but without relief. Two hours later he was given morphine sulfate again without effect. This was repeated soon after without result.

In about five hours the patient developed a severe burning sensation affecting the entire skin area of his chest. The area about his head became progressively swollen, reaching its greatest proportions on the second day. The first day the skin on the upper part of his body took on an erythematous hue, gradually becoming cyanotic on the second day. There also developed during this same period a massive hematoma involving a large part of the face, greater part of the head, neck, and upper part of the chest. The swelling was sufficiently extensive to impair breathing and swallowing. Movement of his thoracic muscles became exceedingly painful.

On the fourth day the patient was transferred from Ischia Island to the International Hospital in Naples where he was examined by the Medical Director, Dr. Paul Burkhard, who kindly provided this case history. At the time of admission the patient complained of pains in the right cheek, neck, thorax, scapular region, and skin of the head. These areas were greatly edematous and firm, with evidence of extravasation of blood into the tissues (figs. 7 and 8). At this time the patient was suffering from severe dyspnea because of the massive edema about the throat but within a day or two after his arrival at the hospital he began to improve rapidly.

Upon entry to the hospital the patient's temperature varied between 99° and 101° F. with pulse rate between 99 per min and 100 per min. Blood pressure was 130/85 mm Hg, red blood cell count 3,820,000 per  $\mu$ l, hemoglobin 82 per cent, platelet count 240,000 per  $\mu$ l, white blood cell count 13,600 per  $\mu$ l, neutrophils 77 per cent, lymphocytes 11 per cent, monocytes 11 per cent, eosinophils 1 per cent, baso

phile and plasma cells, none. The lymphocytes showed no toxic granulation. Specific gravity of the urine was 1.028 and urobilinogen was normal. There were no other findings of significance.



*Figure 7 Appearance of patient who had been stung by a weever believed to be *Trachinus vipera*. Note edematous areas and extravasation of blood into tissues.*

**Family History.** The patient had a brother who died at the age of 14 years supposedly of hemophilia and he himself had a number of hemorrhages as a boy for which he was treated with vitamin-K therapy. He had had no recent hemorrhages.

Treatment was symptomatic. Oxygen was administered for two days during the period of respiratory embarrassment and cold moist compresses were applied to the areas of swelling. Various opiates were administered but were ineffective. Solutions of vitamins, calcium, and glucose were given intravenously during hospitalization.



Figure 8 Full view of

in figure  
erh.

ked edema of

The patient was  
which time the swelling  
shoulder had almost dis-  
colored. There was no pain  
unusually

0 day  
of the  
the  
tres

non a  
right  
s

## TREATMENT

There are no known specific antidotes for weever venom, and treatment is for the most part symptomatic. Effort should be directed toward alleviating pain, combating the effects of the venom, and preventing secondary infection. The pain results from the trauma produced by the fish spine, the venom, and the slime and other irritating foreign substances introduced into the wound.

Weever stings usually are of the puncture wound variety, and removal of the venom is difficult. If seen early, it is sometimes advisable to make a small incision across the wound and apply suction. Irrigation of the wound with cold salt water is helpful, but generally is not possible in weever stings.

There is a division of opinion as to the advisability and of efficacy of using a ligature in the treatment of fish stings. If used, it should be placed at once between the site of the sting and the body, but as near the wound as possible. The ligature should be released every few minutes in order to maintain adequate circulation.

Whether or not a ligature is used, the member should be soaked in hot water for 30 minutes to an hour. The water should be maintained at as high a temperature as the patient can tolerate and as can be used without injury. This treatment should be instituted as soon as possible. If the injury is to the face or hand, hot moist compresses should be employed. High temperatures attenuate the potency of the venom. The addition of magnesium sulfate or epsom salts to the water is believed to be useful.

Infiltration of the wound area with 0.5 to 2 per cent procaine hydrochloride has been tried with good results. If local measures prove unsatisfactory, intramuscular or intravenous meperidine hydrochloride generally will be efficacious. Incisions should be closed with dermal sutures and the injured area covered with an antiseptic and a sterile dressing.

Prompt institution of the recommended treatment usually eliminates the necessity for antibiotic therapy, but if edema has resulted to any extent, antibiotics may be desirable. A course of tetanus antitoxin is an advisable precautionary measure.

The primary shock that immediately follows the stinging generally responds to simple supportive measures. However, the secondary shock resulting from the action of the venom may require immediate and vigorous therapy. Treatment should be directed toward maintaining cardiovascular tone and the prevention of any further complications. Respiratory stimulants may be required. Some of the advice given by Russell<sup>10</sup> in his excellent



review on the treatment of sting ray stings probably is pertinent to the handling of injuries produced by weevers.

Stahnke<sup>11, 12</sup> recommended a treatment for venomous animal stings that differs considerably from the preceding. The treatment is known as the L. C. (ligature cryotherapy) method. Immediately after being stung and without making an incision, the victim places a ligature between the site of the sting and the body at the point nearest the entrance of the venom. The hand or foot, including the ligature, is immersed in iced water. The ligature is removed after the member has been in iced water for not less than 5 or more than 10 minutes, but the affected part must remain in the iced water for a minimum of 2 hours. There is said to be no danger of frostbite if ice water alone is used. Salt must not be added. Stahnke stated that this method has been employed several times in cases of sting ray stings, with good results. There are no known instances in which it has been employed for weever stings.

### TOXICOLOGY

Winkler<sup>13</sup>, Schmidt<sup>14</sup>, Gressin<sup>15</sup>, Coutiero<sup>16</sup>, Pohl<sup>17</sup> and Phisalix<sup>18</sup> tested crude extracts of weever venom on various laboratory animals, but their studies were of a general nature and revealed little of the pharmacologic properties of the venom. Briot<sup>17-21</sup> and Evans<sup>22-24</sup> have shown weever venom to possess antigenic properties and to have a hemolytic effect on mammalian red blood cells. De Marco<sup>25, 26</sup> reported that weever venom injected into the dorsal lymph sac of frogs results in reflex excitability, tonic and clonic convulsions, paralysis, loss of position and spinal reflexes and death. Nothing is known of the chemistry of weever venom.

### SUMMARY

Weevers probably are the most venomous of temperate zone marine fishes. Because of their habit of concealment, aggressive attitude and virulent venom apparatus, they constitute a hazard to divers, swimmers and fishermen. The four known species, *Trachinus araneus*, *Trachinus draco*, *Trachinus radiatus* and *Trachinus vipera*, are largely confined to the eastern Atlantic and Mediterranean coasts. The venom apparatus consists of dorsal and opercular stings. Wounds produced by these fishes are extremely painful and may result in death. A recent case is discussed in detail. Treatment is largely symptomatic. There are no known specific antidotes. The pharmacologic and chemical properties of weever venom are largely unknown. Animal studies suggest that the venom contains both neurotoxic and hemotoxic fractions. Additional research on the subject is needed.

ACKNOWLEDGMENT The writer is indebted to Robert Kunsinger for preparation of illustrations used in this article

## REFERENCES

- 1 Halstead B W and Modlin F R Venom apparatus of weeverfish *Trachinus* To be published
- 2 Bourlense Mémoire sur les effets de la piqure des arêtes de la vive *J de méd. nat* 1 371 382 1882
- 3 Evans H M Sting fish and seafarer Faber & Faber Ltd. London 1943 pp 1 180
- 4 Bottard A Note sur la piqure de la vive *Compt rend Soc de biol* 2 23 36 1885
- 5 de Marco R Sull'azione neurotossica del veleno di trachine e sull'epilessia umana riflessa *Riv di pat nerv* 47 204 08 Jan Feb 1936
- 6 Gressin L Contribution a l'étude de la nature du venin chez les poissons du genre "Vive" Thesis Faculté de Médecine Paris 1884 pp 1 50
- 7 Coutiere H Poissons venimeux et poissons venenueux, Thesis École Supér Pharmacie Paris 1899 pp 1 217
- 8 Philisatix M, *Animaux venimeux et venins* Masson & Cie Paris 2 vols 1922
- 9 (unio I Poisonous fish *Higijena i Tehnika* 1 (7 12) 782 318 1949 (In Serbo-Croatian)
- 10 Russell F L Stingray injuries: review and discussion of their treatment *Am J M Sc* 226 611-623 Dec 1933
- 11 Stahnke H L L C treatment of venomous bites or stings *Am J Trop Med* 2 142 143 1953
- 12 Stahnke H L L C method of treating venomous bites and stings *Poisonous Animals Res Lab Arizona State College* 1 28 1954
- 13 Rinkler T C *Malays and Petermann*, Harris en Kunst 1868 pp 75 79 Cited by Coutiere in reference 7 not seen by author
- 14 Schmidt F T Om farsingens stik og giftredskaber *Nord med. Ark* 6 (2) 120 1874
- 15 Pohl J Beitrag zur Lehre von den Fischgiften *Trag med. Wchenschr* 18 (4) 31 33 1893
- 16 Philisatix C Expériences sur le venin des vives (*Trachinus vipera* et *Tr draco*) *Bull Mus Hist Nat* 5 (5) 256-258 1899
- 17 Briot A Sur l'action du venin de la vive (*Trachinus draco*) *Compt rend. Soc de biol* 54 1169-1171 1902
- 18 Briot A Immunisation des lapins contre le venin de la vive et action préventive du serum des animaux immunisés *Compt rend. Soc de biol* 54 1172 1174 1902
- 19 Briot A Action hemolytique du venin de vive *Compt rend. Soc de biol* 54 1197 1198 1902
- 20 Briot A Études sur le venin de la vive (*Trachinus draco*) *J de physiol et de path gen* 6 271 282 1903
- 21 Briot A Sur l'existence d'une linase dans le venin de la vive (*Trachinus draco*) *Compt rend. Soc de biol* 56 1113 1114 1904
- 22 Evans H M Observations on poisoned spines of weever fish *Trachinus draco* *Brit M J* 1 73 76 1907
- 23 Evans H M Further studies in haemolysis by weever venom *Brit M J* 1 (2572) 982 984 1910
- 24 Evans H M Defensive spines of fishes: living and fossil and glandular structure in connection therewith with observations on nature of fish venoms *Phil. Tr R Soc London Ser B* 212 1 33 1923
- 25 de Marco R Effetti del veleno di *Trachinus* e di quello di *Scorpaena* sulla attività neuromuscolare della rana *Arch di fisiol* 37 398 404 1937
- 26 de Marco R Effetti del veleno di *Trachinus* sulla capacità di lavoro del gastrocnemio di rana *Riv Biol* 25 225 234 1938

# SUITABILITY OF IVALON SPONGE TUBES FOR REPLACING VASCULAR SEGMENTS

JULIO C. DAVILA *Captain, MC USA*

DALE SHULTZ *Captain, MC USA*

ELMORE M. ARONSTAM *Lieutenant Colonel MC USA*

**T**HE PHYSICAL properties of Ivalon (polyvinyl formal sponge) are such that this material appears to offer many advantages not available with other synthetic materials for use in replacement of vascular segments. Among these advantages are the ease of fabrication of straight or branched tubes, the consistency and texture of the finished product which facilitates handling, suturing and tailoring to the requirements of a given situation and the porosity of the substance which is compatible with tissue infiltration. Several workers have carried out investigations to adapt this material to vascular surgery,<sup>1-3</sup> and some of these reports have been encouraging.

This presentation is the result of the trial of Ivalon for replacing segments of abdominal and thoracic aorta in dogs.

## MATERIALS AND METHODS

**Types of Ivalon Sponge.** Four types were used: (1) Rubatex Ivalon, porous, in sheets 1/8 inch thick, Type F 451 V manufactured by Rubatex Division of Great American Industries, Inc., Bedford, Va.; (2) Rubatex Ivalon compact, in sheets 1/8 inch thick, Type R 401 V; (3) Clay Adams Ivalon surgical sponge—Formulation V in bricks obtained from Clay Adams Co., Inc., New York 10, N. Y.; and (4) Prosthex Ivalon surgical sponge in bricks obtained from the Rarer Chemical Company, Ltd., Surrey, England.

**Rubatex Ivalon.** Both the compact and porous material appeared to have satisfactory elasticity, softness, porosity, and strength and seemed physically excellent for the purpose intended but the manufacture of tubes proved to be difficult. Preparation by boiling 15 to 30 minutes did not result in adequate fusion or adhesion, and preparation by use of dry heat at higher tempera-

From Valley Forge Army Hospital, Phoenixville, Pa. The surgical portion of this work was done at the Thoracic and Cardiovascular Research Laboratory, Presbyterian Hospital, Philadelphia, Pa. Project No. 6-60-01-002 of the Research and Development Division, Office of the Surgeon General of the Army. Dr. D. V. Jones, Presbyterian Hospital, Philadelphia, Pa.

tures required excessive compression of the sponge in order to attain satisfactory fusion, thus losing porosity. These disadvantages were particularly noticeable with the compact material, but apply to the porous as well.

*Clay-Adams Ivalon Surgical Sponge* This material proved very satisfactory to work with. Boiling produced tubes with excellent initial strength. The major disadvantage was the nonuniform pore size of this product. Frequent large bubbles resulted in areas of weakness or leaks of the finished tube wall.

*Prosther Ivalon Surgical Sponge* This material is similar to the Clay-Adams product, but has the advantage of more uniform pore size.

*Molds* Glass, polished stainless steel, copper, and brass rods or tubes having parallel or tapered sides were used to mold the Ivalon tubes. No branched segments were constructed because this study did not involve the use of complex grafts. For straight tubes, either glass or stainless steel molds were highly satisfactory. In the later stages of the work, slightly tapered molds were used to achieve a closer approximation to the size of the host vessel at both ends of the graft.

*Animals* Mongrel dogs ranging from 10 to 20 kg in weight were used. All animals were inoculated against distemper and hepatitis, and dewormed preoperatively. Anesthesia was produced with intravenous pentobarbital sodium, 15 to 30 mg per kg. Ventilation during surgery was achieved by connecting a Pneophore\* respirator to a metal endotracheal cannula and using 100 per cent oxygen. All animals were given 180 mg (300,000 units) of penicillin and 1 gram of streptomycin daily for the first 4 postoperative days.

*Surgical Technique* Abdominal aortic grafts were placed between the renal vessels and the trifurcation of the aorta. The grafted segment was covered with peritoneum routinely. Thoracic aortic grafts were placed in the mid descending aorta. Aortic occlusion was made possible either by hypothermia or by arterial shunting. The technique of anastomosis in all instances involved the use of a continuous over and over stitch after initial fixation with two or three everting mattress sutures. No 0000 or No 00000 Ethicon vascular sutures were used. The grafted segment was irrigated frequently with a dilute solution of heparin in saline. Vascular clamps of several types were used initially, and carefully sprung Glover ductus clamps\*\* were finally adopted for routine use, however all vascular clamps caused serious damage to

the vessel unless they were properly sprung and when properly sprung any were satisfactory

### EXPERIMENTS

**Group A Pilot Experiments** Six dogs were used in this phase of the work. Initially, the Rubatex Ivalon porous sponge was prepared by cutting 1 by  $\frac{1}{4}$  inch strips and wrapping them around glass or metal rods spirally, edge to edge. A counterspiral was then added as a second layer. Compression was obtained by loosely wrapping this preparation with 1 inch wide cotton tape. The tubes were then boiled for 20 minutes and stored in 1:1,000 Zephiran Chloride (brand of benzalkonium chloride) solution. This material was placed in the abdominal aorta in three dogs. All three animals died within 2 days. The material was too loosely fused, too porous, easily torn, and thicker than desirable. The tubes were patent in each case.

Rubatex Ivalon compact sponge was prepared in the same manner as above but with considerably more compression. The tubes were heated in a dry oven at 375°F for 15 to 20 minutes. These tubes were much stronger and thinner, but the porosity was very poor. Although the material was stiff, it sewed and handled well. These tubes were implanted in the abdominal aortas of two dogs. One of these animals died within 12 hours postoperatively of undetermined cause. The second dog was sacrificed 5 days postoperatively because he had developed paralysis of the hindquarters and had no femoral pulsations. The graft was completely occluded with clot. There was no fixation externally. The material was stiffer in the tissues than it had been at the time of implantation.

Rubatex Ivalon porous sponge, prepared as described below for Group B, Lot 1 was implanted in one dog. This material was strong and handled well. The graft was patent at 15 days and grossly appeared satisfactory.

All of these prostheses were 7 mm in internal diameter. One was 15 cm long, the rest were 5 to 6.3 cm in length.

**Group B Lot 1 Grafts** These prosthetics were made of 1 to 1 inch strips of Rubatex Ivalon porous sponge. The strips were wrapped on glass rods spirally, edge to edge, and a second layer was similarly wound in a counterspiral. The tubes were firmly compressed with an outer wrapping of cotton tape and molded by heating in a dry oven at 275°F. The grafts were stored in 1:1,000 Zephiran Chloride solution.

The prostheses were implanted in the abdominal aorta below the renal arteries in 10 dogs. Five of these animals died at 4, 7, 9, 13, and 26 days postoperatively. In three of these the cause of death was hemorrhage from the proximal aortic stump.

In one, thrombosis and hindquarter paralysis occurred. In the fifth, wound dehiscence caused the death. Three of these grafts were patent, one was partially clotted and one was completely clotted. The remaining five animals were sacrificed at 7, 9, 16, 46, and 81 days. The grafts were completely obliterated in all five animals.

Four of this group of grafts measured 9 mm in internal diameter, one was 7 mm. One graft was 7 1/2 cm long, and four were 2 to 3 1/2 cm long. The caliber in each instance was matched closely to that of the recipient vessel. The animals in which these grafts were implanted showed necrosis of the aortic stump between the site of occlusive clamping and the anastomosis. This had led to the hemorrhage in the three animals noted above. In grafts that were clotted, injury to the vessel was suspected of being the site of origin of the thrombus. There was no correlation between the caliber or length of the graft and the evidence of clotting. Microscopically, there was poor fixation externally, poor tissue infiltration in the interstices, and a moderate degree of inflammatory reaction about the grafts. The material handled well, was strong, and sutured well, but probably was too dense and somewhat too inelastic.

**Group C Lot 2 Grafts** A slight modification was introduced in the manufacture of this lot of grafts. The same material, Rubtex Ivalon porous sponge, was wrapped as in Lot 1, but was compressed less tightly. The grafts were molded by heating in a dry oven at 260° to 270°F and stored in 1,000 Zephiran Chloride solution.

Grafts of this type were implanted in two dogs in the abdominal aorta below the renal arteries. One animal with a 6 cm by 7 mm graft died at 13 days postoperatively with hindquarter paralysis caused by thrombosis. There was poor external fixation. The second animal was sacrificed 73 days postoperatively. The 3 cm by 7 mm graft was patent, had a good pseudointima, better but still incomplete infiltration, somewhat better fixation than with Lot 1, and a moderate degree of inflammatory reaction.

To determine the ideal degree of compression of the Ivalon sponge, the following experiments were carried out.

**Blocks of Clay Adams Ivalon** surgical sponge measuring approximately 1/4 by 1/2 by 2 1/2 inches were cut from the uncompresses bricks. These blocks were then placed in small aluminum presses, and compressed so that at one end of the strip the material was reduced to paper thickness and at the other there was no compression. These "wedges" were then implanted subcutaneously in several animals and left in place for periods of 1, 2, 3, 4, and 6 weeks. One half of these wedges had been stored in 1,000 Zephiran Chloride solution. The other half

were implanted immediately after boiling. One half of the Zephiran treated wedges were thoroughly washed in sterile distilled water before implantation. The others were simply wrung out and not washed.

The histologic observations on these implants are described below. The degree of compression best suited to vascular grafts was not found to be determined by tissue infiltration rate or quality but rather by the gross requirements of vascular grafts: that is, porosity compact enough to preclude troublesome oozing and thickness adequate for strength and for manipulation. The most satisfactory tubes were those prepared as in Lot 4 described below.

**Group D Lot 3 Grafts** These grafts were made from Clay Adams Ivalon surgical sponge. The bricks were thoroughly washed, frozen, and sliced in a meat slicer to  $1/8$  and  $3/16$  inch thicknesses. Strips  $1\frac{1}{4}$  inches wide were cut from these. The tubes were constructed of a double counterspiral as above, compressed to about one third of the total thickness, and boiled for 20 minutes in distilled water in an open pan. The grafts were then stored in Zephiran Chloride solution. These prostheses were very good from the standpoint of elasticity, strength, flexibility and porosity. There was no true fusion of the plastic, but the degree of adhesion made it difficult to separate the layers after boiling.

These grafts were implanted in the abdominal aorta in 15 dogs. Four of these animals died within 1 to 4 days. In two the cause of death was unexplained. One of these grafts was completely thrombosed in 3 days.

Eleven dogs were sacrificed 20 to 34 days postoperatively. In five, there was complete thrombosis. The grafts were  $2\frac{1}{2}$  to 4 cm long. In internal diameter, three were 6 mm and two were 7 mm. Thrombosis was not related to the site at which the aorta had been clamped. In six animals, the grafts were patent and lined by clean pseudointima. These grafts were  $2\frac{1}{2}$  to 6 cm in length, and from 6 to 7 mm in internal diameter.

This material handled well, was strong and elastic. It was not quite as porous as was thought desirable.

**Group E Lot 4 Grafts** These prostheses were made of the same material as lot 3.

After thorough washing the bricks were compressed to 50 per cent of their thickness in a press and boiled for 20 minutes. They were then sliced along the longer edge to a thickness of  $1/16$  inch. These strips were about 1 inch wide and  $8\frac{1}{2}$  inches long. They were wrapped spirally on glass rods overlapping one half the width and a second strip was counterwound. This gave a total wall thickness of four layers. This preparation

was then compressed to about one third of its original thickness and boiled for 20 minutes just prior to implantation.

The tubes were implanted in the abdominal aorta below the renal arteries in 14 dogs. Five of these animals died within 24 days. A specimen at 1 day and one at 24 days showed thrombosis. The other three were patent after 6 to 21 days.

Nine animals were sacrificed 32 to 360 days postoperatively. One of these implants was thrombosed after 43 days. This graft was 4.4 cm by 7 mm in size. One graft was partially thrombosed after 7 1/2 months; this graft was 3 cm in length. Seven grafts were patent. One of these was 4.6 cm by 6 mm, the others were 2.5 to 5 cm by 7 mm.

This material handled extremely well, held sutures nicely, was strong, and pulsed perhaps slightly more than the aorta. Grossly, the patent grafts were lined with a clean pseudointima layer. There was good external fixation. There was negligible inflammatory reaction.

**Group F, Lot 4 Grafts.** In this group, the prostheses, prepared as in Group L, were implanted in the descending thoracic aorta in 14 dogs. The animals were operated under hypothermia. Cooling was accomplished by immersion. Rectal temperatures of 73° to 88°F, with an average of 83°F, were attained. Aortic occlusion was carried out for periods of 20 to 50 minutes, with an average of 35 minutes.

Of these 14 dogs, one died the first day of cardiac arrest and nine died after 4 days from atelectasis with empyema. In one of these dogs, the implant was completely thrombosed 4 days postoperatively, while the others were patent and were lined by smooth fibrin, or were clean. One dog died after 26 days, in this case the graft showed a good pseudointima grossly.

The remaining three dogs were sacrificed 330 and 360 days postoperatively. The graft in one dog sacrificed after 360 days was partially thrombosed but not occluded. The other two, at 330 days, were patent and well lined by a smooth and glistening pseudointima 1 mm or more in thickness. There was good external fixation.

**Group G, Lot 4 Grafts.** These prostheses, which were prepared as in Group E, were implanted into the thoracic aorta in 19 dogs. Aortic occlusion was made possible by the use of a pump bypass. The left brachiocephalic artery and one femoral artery were cannulated. Tygon tubing from the proximal cannula was led through a Sigmamotor Pump and connected to the femoral cannula. The animal was given 1.5 mg of heparin per kg of body weight. After the implantation was completed, the bypass was taken down and the heparin neutralized with an equal dose of protamine sulfate.



This procedure made possible prolonged occlusion of the thoracic aortic in the normothermic dog. By adjusting blood flow through the pump, normal arterial mean pressure could be maintained both proximally and distally. The greatest difficulty in this technique arose from the necessity for using heparin which caused considerable oozing from the grafts and at the anastomoses.

Nine of the 19 dogs survived the procedure. One died in 2 days from bleeding and atelectasis. One died after a week from undetermined cause and one died after 10 days from hemorrhage, although the bleeding point could not be located. The causes of death in the 10 that died the first day were technical, relating to the difficulties of cannulation and control of bleeding after operation. The grafts in these animals were all patent, but all were specimens less than 24 hours old. The grafts in those animals which died in from 2 to 10 days also were patent.

Of the six dogs which were long term survivors, one died after 4 months following hemoptysis of unknown source. Five were sacrificed at 9 to 11 months postoperatively. Grossly, all these grafts appeared to be well lined with a smooth layer of pseudointima (fig. 1). There was good external fixation. These grafts were 3 to 6 cm in length and 10 mm in internal diameter.

Group H. Lot 4 Grafts (Prostheses). These prostheses were prepared as other Lot 4 grafts but using Prostheses Ivalon surgical sponge. This material exhibited the same excellent handling properties as the Clay Adams surgical sponge and sewed well. It was strong and pulsated slightly more than the aorta. It was considered to have the advantage of smaller and more uniform pore size. It molded well boiling in distilled water for 20 minutes.

Five dogs were implanted with tubes from this group. Four died after 2 to 7 days from bleeding and atelectasis. One graft had a small thrombus that originated at a defect in the distal portion of the graft. One dog lived for 2 months and died from unexplained causes. The graft was patent and well lined. External fixation was good.

#### HISTOPATHOLOGIC FINDINGS

**Wedges.** Three wedges prepared as described above and embedded for 6 weeks in subcutaneous tissue were examined. They were sectioned longitudinally and at three levels in the transverse plane. In all sections the interstices of the sponge were filled with connective tissue (fig. 2). There was no evidence of progression from the external surface toward the center. Slight differences among the three wedges were noted. In wedge A the fibrous tissue was more vascular with dilated capillaries and appeared to show younger granulation tissue than the other two. In wedge B the collagen fibers were larger and

less cellular, but there were a few more polymorphonuclear cells scattered about. In wedge C, the collagen was still more dense and mature. In all three, there were many foreign body giant cells. It is thought that perhaps wedge C, which was soaked in Zephiran Chloride solution and not washed, provoked the most violent inflammatory reaction, while wedge A, which was

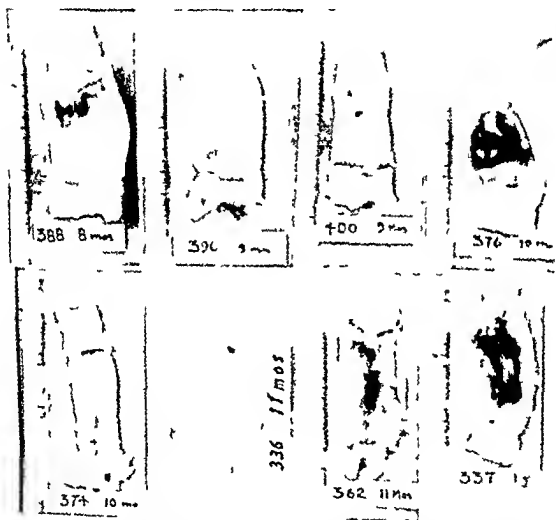


Figure 1 Photographs of eight specimens all Lot 4. Although some resulted in very satisfactory vascular replacement (No 396 400 374) the disturbing finding of dilatation of the tube (No 336 376 337 and others) and the microscopic demonstration of disintegration of the plastic make this material unreliable. Some specimens show variable degrees of mural thrombosis even as long as one year after implantation.

not treated with Zephiran, provoked the least. This would explain the more rapid proliferation of granulation tissue. Continuing inflammation with the accumulation of neutrophils would hinder the formation of fibrous tissue, but the early stimulation of fibrin rich exudate would hasten the laying down of fibrous tissue.

Wedges that had been embedded for periods of 1 to 4 weeks also were examined. The 1 and 2 week specimens showed acute



Figure 2 At the top is shown early infiltration of the plast c by vascular connective tissue. The lower frame shows mature connective tissue filling the plast c interstices. Note the dark deposits of "mineral" material.

inflammatory reaction, while the 3 week specimens showed well developed vascular fibrous tissue in the plastic spaces. Trichrome stain showed collagen fibers and many foreign body giant cells. The 4 week specimens showed increased density of collagen and many giant cells. The change from inflammatory reaction to fibrosis apparently occurs between the second and third weeks (one second week specimen contained bacterial contamination which obliterated any early fibrous reaction that might have been occurring).

In many of the later specimens, there was a dark granular outline on the periphery of the sponge spicules. This dark material was at first thought to consist of cellular nuclei, but in later observations it was considered that it represented some type of mineral material lining the pores of the sponge. In the latest specimens, it resembled calcification.

**Aortic Grafts.** The various features observed in the aortic grafts can be grouped under seven headings:

1 *Evaluation of graft compactness.* An attempt was made to evaluate the ratio of Ivalon material to pore space, that is, the compactness of the graft. This proved to be extremely difficult and unreliable due to the inconstant shrinkage of the plastic.

2 *Inflammatory reaction.* The degree of inflammation in connective tissue immediately external to the Ivalon sponge varied considerably. In Lot 1, inflammation was marked even in the 120 day specimen. In Lot 3, there was considerable inflammatory reaction with active granulation tissue at 28 days, but there was no significant inflammation at 60 days and thereafter. In Lot 4, there was only slight reaction after 35 days and none in 42 days. Specimen No. 306 (fig. 1) showed red blood cells and polymorphonuclear leukocytes in the interstices, with no evidence of organization. This material had been implanted for 118 days. Absence of organization may be explained perhaps by the presence of infection. Similarly, specimen No. 100 at 9 months showed a layer of granulation tissue with heavy polymorphic infiltrate along the external surface. No. 337 at 12 months also showed polymorphonuclear cells in most of the plastic spaces within the graft as well as along the external surface. The other specimens showed no inflammatory reaction.

3 *Organization in interstices.* Specimens of Lot 1, even as long as 120 days after implantation, showed no organization. The spaces were filled with fibrin and blood cells. In Lot 3, there was slight organization in the outer spaces at 45 days. Complete organization in the outer one third of the Ivalon sponge was observed, however, at 60 to 75 days in both Lot 3 and Lot 4. It is interesting, however, that Lot 4 specimens showed good organization with mature connective tissue one half way through

1462 U. S. ARMED FORCES MEDICAL JOURNAL

4. Fixation to adjacent tissue None of the specimens of Lot 1 showed significant degrees of fixation. In Lot 2, one specimen showed some degree of fixation at 75 days and in Lot 3, a fair degree of fixation was evident at 60 days. Lot 4 showed much earlier fixation with evidence of good anchoring at 35 days and thereafter in the specimens from thoracic aorta, lung tissue was frequently seen on the external surface with good organization extending into the plastic.

5 *Lumina* The degree to which pseudo-intimal proliferation occurs (fig 3) varies considerably and does not show significant differences among the various lots. In general at 14 days the fibrin layer is covered by fusiform cells forming a rerebrined two to three cells thick. By 20 to 25 days this layer has thickened and extends approximately 1 mm from the end of the aorta. At 35 days it reached 2 mm at 45 days, 3 to 4 mm and at 60 days 5 mm. This layer at an early stage overlies fibrin and later bleeds into the fibrin that fills the length of the tube. It consists of both collagen and smooth muscle, with the former occurring in a higher proportion than in the corresponding layer of the neighboring aorta. Although fine elastic fibers were seen in the thickened intima of the adjacent aorta, none were seen in the intima like tissue within the graft. The major elastic layer of the media stopped abruptly at the cut end of the aorta. At 4 foci of inorganic phosphorus deposits appeared in the pseudo-intima and the graft at 35 to 40 days. At 5 to 12 months the luminal surface of the thickened

Lot 4 foci of inorganic and the frequently  
The latest specimens at 7 to 12 months frequently  
continuous intima like layer lining the luminal surface of  
layer varied from one eighth to one quarter of the thickness of  
the graft wall in the majority of the specimens however this  
pseudointima was discontinuous and was covered in patches  
by fibrin One of the latest specimens at 10 months showed  
thrombosis This luminal layer when finally developed con-  
sisted entirely of collagen except in one specimen in which  
trichrome stain showed fibers suggestive of elastic fibers extend-  
be an artifact of staining In no case did elastic fibers extend  
beyond the cut end of the aorta

6 to 10 changes. The changes noted in the aorta although quite variable seemed to have no relation to the lot number but appeared to depend upon the degree of trauma inflicted on the vessel ends. In many specimens hyaline necrosis appeared at the cut ends in from 4 to 6 days. Most of the specimens showed some degree of intimal thickening one as early as 6 days. In another however there was no thickening at 27 days. In general thickening was present at 20 to 25 days and



Figure 3 Sections across the junction of plastic to vessel show formation of the pseudointimal layer. The upper photograph shows early ingrowth of fibroblasts into the fibrin layer. Note the abrupt termination of the elastica (upper left corner). The lower illustration shows a pseudointima of mature connective tissue. Note the state of the plastic material at bottom of both frames. The upper specimen is 27 days and the lower 42 days after implantation.

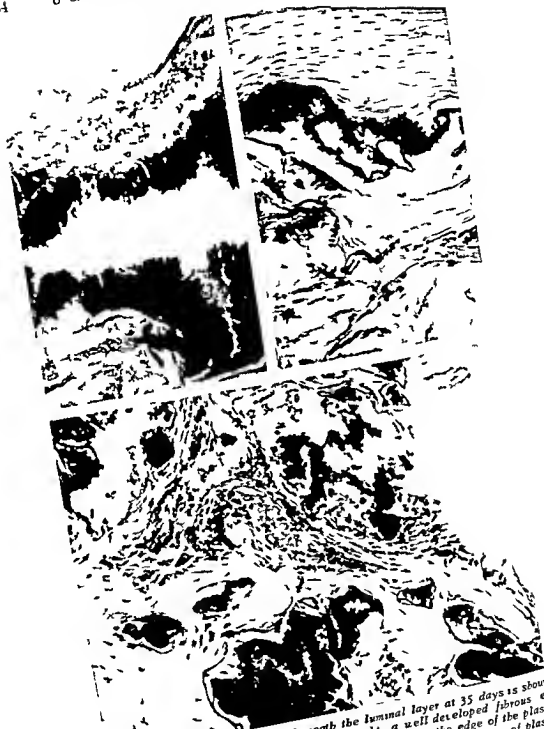


Figure 4 The calcific deposit beneath the luminal layer at 35 days is shown in the left upper illustration. On the right a well developed fibrous external layer is seen and there is calcific material at the edge of the plastic (8 months). The lower illustration shows extensive disintegration of plastic and replacement with calcific material (11 months).

was marked in the 10- to 45 day specimens. In one specimen, at 120 days, there was extreme thickening, together with calcific deposits in the media near the cut ends. In several specimens, there were focal areas of thickening away from the cut ends, and in one 35 day specimen from Lot 1 there also was some calcium in the media of the aorta. Elastic tissue stains showed that in earlier examples there were no elastic fibers, or at most very fine fibrils running in all directions and possibly representing reticular fibers. In the later specimens, however, there were well defined elastic fibers oriented longitudinally but not as heavy as the normal elastic tissue of the media. There were two specimens in which a very few fine fibrils appeared to extend from the junction of the aorta and graft for a short distance into the pseudointima. These may represent regenerated elastic fibers.

*7 Changes in the plastic.* The most significant and undesirable changes noted (fig. 1) were as follows. Dark deposits suggestive of calcification first appeared on the edges of the plastic spicules at 6 to 8 weeks. Several specimens showed layers of finely divided calcific material between the plastic and luminal layer at 5 and 6 weeks. Variable amounts of this material were seen in all specimens, until at 8 to 9 months the plastic seemed to be coated by frankly mineral material, in the sense that the investing material had a refractile appearance. At 10 and 11 months, the plastic was undergoing obvious disintegration. This seemed unrelated to inflammatory change, because one specimen at 12 months showed considerable inflammatory reaction but no plastic degeneration. These changes were also unrelated to the lot number of the grafts.

### SUMMARY AND CONCLUSIONS

The physical properties of Ivalon (polyvinyl formal sponge) appeared to offer certain advantages not available with other materials for use in replacing vascular segments. To test this, four types of Ivalon sponge were obtained from three different manufacturers and prostheses were prepared by boiling or dry heat, using various techniques. These were implanted in mongrel dogs as abdominal or thoracic aortic grafts.

The Rubatex product proved to be unsatisfactory for vascular replacement, not only on the basis of difficulty in fabrication of the tubes but also because it appeared to be less well tolerated by tissue and less satisfactorily infiltrated by collagen material. It was associated with inflammatory reactions more frequently than were the other two types of Ivalon. The Clay Adams and Prosthesex materials were good from the standpoint of fabrication of the prostheses as well as in regard to tissue tolerance. The most serious limitation to the use of these materials is indicated by late changes seen at 10 months and consisting of extensive disintegration or fragmentation of the graft material. It appears



## U. S. ARMED FORCES MEDICAL JOURNAL

that such a process can only lead to eventual disruption of the grafted segment, because fibrous scar tissue alone and unsupported eventually undergoes aneurysmal dilatation.

Technically, tubes of Lots 3 and 4 were satisfactory. Suture qualities, initial pliability, elasticity, and porosity were excellent. However, gross examination of these implants at a very few weeks showed loss of elasticity, reduction of wall thickness, brittleness and discoloration of the plastic, and sometimes slight reductions of caliber of the tube. In a few late specimens, there was evidence of plastic disintegration described microscopically. The finding of early clotting or thrombosis was very high in the first lots used in the abdominal aorta. Occlusion by thrombosis in the thoracic implants did not occur, except in the case of one animal that died with empyema a few days after the operation. There were, however, several specimens which showed varying degrees of mural thrombosis.

In one of the pilot experiments, disruption of the spirally wound prosthetic occurred, resulting in fatal hemorrhage. In none of the other animals was there rupture or separation of the plastic material.

The use of the pump shunt during occlusion of the thoracic aorta has many advantages over the use of hypothermia, but the need for using heparin makes hemostasis very difficult particularly with regard to blood oozing through the pores of the graft. Immersion of the sponge in nonheparinized blood before implantation might be a means of minimizing this disadvantage. This technic should be further evaluated.

## REFERENCES

- 1 Grundlay J H and Wagh J M. Plastic sponge which acts as framework for living tissue. Experimental studies and preliminary report of use in aneurysms. *A. M. A. Arch. Surg.* 63: 288-297, Sept. 1951.
- 2 Shumway N E, Gilman M L, and Lewis F J. Experimental study of use of polyvinyl sponge for aortic grafts. *Gynec. & Obst.* 100: 703-706, Jan. 1955.
- 3 Mikkelsen J D and Grundlay J H. Molded silicone sponge for replacement of aortic and major arterial aneurysms. *A. M. A. Arch. Surg.* 72: 871-878, May 1956.
- 4 Benjamin R B, Tuback C E, Hannon O W, Shumway N E, and Lewis F J. Polyvinyl sponge: an experimental study in surgery. *Ann. Surg.* 145: 509-516, Apr. 1957.
- 5 Harrison J H. Ivalon sponge (polyvinyl alcohol) as a blood vessel substitute (a literature in experimental animals). *Surgery* 41: 729-739, May 1957.

# REDUCTION OF IONIZING RADIATION IN DIAGNOSTIC ROENTGENOLOGY

ARCHIBALD G. M. MARTIN III *Lieutenant Colonel USAF (MC)*

THE UNITED Nations Scientific Committee on Effects of Atomic Radiation<sup>1</sup> recently expressed its desire to receive information as to the methods and extent by which economy in the medical use of radiation could be achieved, both by avoiding examinations that were not clearly indicated and by decreasing the exposure to radiation during examinations, particularly if the gonads or the fetus during pregnancy lie in the direct beam of radiation. The Committee concluded rather logically "It appears most important, therefore, that medical irradiations of any form should be restricted to those which are of value and importance, either in investigation or in treatment, so that the irradiation of the population may be minimized without any impairment of the efficient medical use of radiation."

The use of irradiation in industry, engineering, and allied professions has greatly enhanced the possibility for individual exposure, both known and unknown. Young people, particularly, should attempt to learn the type and quantity of the exposure to which they have been subjected, and this should be evaluated before extensive, diagnostic, medical irradiation is contemplated. Each patient requiring therapeutic treatment should be studied minutely. Quimby and Lawrence<sup>2</sup> in 1940 and Henschaw<sup>3</sup> in 1946 have set down rather specific definitions for exposure or dose.

Probably the most publicized and misinterpreted report on the biological effects of atomic radiation is that of the National Academy of Sciences. The section by the Committee on Genetic Effects of Atomic Radiation stated "First, although the science of genetics is as precise and as advanced as any part of biology, it has in general, and particularly in human genetics, not yet advanced far enough so that it is possible to give at this time precise and definite answers to the questions just how undesirable, how dangerous are the various levels of radiation, just what unfortunate results would occur?" The scientists cannot say with exact precision just what biological risks are involved in

---

From U. S. Air Force Hospital, Harlingen Air Force Base, Harlingen, Tex.

various levels and sorts of radiation exposure. When a gene becomes permanently altered we say it mutates. The gene in its altered form is then duplicated in each subsequent cell division. If the mutant gene is in an ordinary body cell then it is rarely passed along to other body cells but the mutant gene, under these circumstances is not passed on to progeny and the effect of the mutant gene is limited to the person in whom the mutation occurred.

It cannot safely be assured however that the effect is a negligible one on the person in whom the mutation occurred nor can it be said that this effect is non-genetic even though passage to offspring is not involved. Various kinds of cellular abnormalities are known to be perpetuated within an individual through body cell divisions so these effects are genetic in the broad sense.

Individuals bearing harmful mutations are handicapped relative to the rest of the population in that they tend to have fewer children or to die earlier. Hence such genes are eventually eliminated—soon if they do great harm more slowly if only slightly harmful. A mildly deleterious gene eventually may do just as much total damage as a grossly or abruptly harmful one because the milder mutant gene persists longer and has a chance to harm more people.

Although many mutations do disturb normal embryonic growth it is not correct that all or even that most mutations com only result in monstrosities or freaks. In fact the commonest mutation is those with the smallest direct effect on any one generation—the slightest detrimental. The last remark deals with all types of radiation induced mutations however there are others such as mutations that arise from natural causes. These naturally occurring and hence unavoidable mutations are called spontaneous mutations. As with radiation induced mutations nearly all of the effects of spontaneous mutations are usually thought to be harmful. It has been stated that about 2 per cent of tangible genetic defects—which include certain mental defects—epilepsy malfunctions neurovascular defects and many others—are present at birth or appear before sexual maturity. If man made radiation increases the mutations by a "doubling dose" with an increase from two million defects to four million defects approximately 200 000 new tangible defects should occur in the first generation.

The total dose of radiation is what counts. This statement is based on the fact that genetic damage done by radiation is cumulative. The geneticists also conclude that mildly larger doses of radiation would produce more but not worse mutants.

The genetic importance to a child is the total radiation dose that the child's parents have received from their conception to the conception of the child. It seems sensible to use a round figure of 30 years in this connection, especially since this figure is the one usually chosen to measure a generation.<sup>4</sup>

Most studies on mutation from exposure to radiation has been done on the genes of the mouse and the fruit fly. Unfortunately, geneticists have assumed that mouse and fruit fly statistics apply reasonably well to man. It seems necessary to emphasize this matter of approximate estimation, so that no one will conclude improperly that a statement is unreliable because it involves a range of values. On the contrary, such a statement, when made in a situation like the present one, should be viewed as all the more dependable precisely because it does not pretend to an unwarranted accuracy. Henshaw, in discussing the radiation induced mutants in human beings, stated "With the possibility of irradiation induced mutations appearing so likely, why are abnormalities not seen more often in the offspring of individuals exposed to radiation? Two possible explanations will be offered here and others will become apparent later. First, irradiation induced mutations result in changes which are often identical with changes which arise spontaneously making the detection of abnormalities resulting from exposure to radiation dependent upon statistical evaluations. Some statistical studies have been made but, although a small amount of positive evidence has been obtained, the data are so limited they have little meaning. Second, many mutations are recessive in character and, since the possibility of two similar mutant genes coming together in the same individual is very remote at first, the process of production of such genes must be in operation a long time before recessive characters can be manifested in appreciable numbers."

Many scientists have tried to develop the lowest figure that could be responsibly considered an acceptable dose rate. Various arguments reduced the 5 r to 150 r range and several experienced geneticists have recently made estimates in the narrower range of 30 r to 80 r. The National Academy of Science recommended "that the general public of the United States be protected, by whatever controls may prove necessary, from receiving a total reproductive lifetime dose (conception to age 30) of more than 10 roentgens of man made radiation to the reproductive cells. Of this reasonable (not harmless, mind you, but reasonable) quota of 10 roentgens over and beyond the inevitable background of radiation from natural causes, we are now using on the average some 3 or 4 roentgens for medical X rays. This is roughly the same as the unavoidable dose received from background radia

various levels and sorts of radiation exposure become permanently altered we say it mutates. The gene in its altered form is then duplicated in every subsequent cell division. If the mutant gene is in an ordinary body cell then it is merely passed along to other body cells, but the mutant gene under these circumstances is not passed on to progeny and the effect of the mutant gene is limited to the person in whom the mutation occurred."

It cannot safely be assumed however that the effect is a negligible one on the person in whom the mutation occurred nor can it be said that this effect is nongenetic even though passage to offspring is not involved. Various kinds of cellular abnormalities are known to be perpetuated within an individual through body cell divisions so these effects are genetic in the broad sense.

Individuals bearing harmful mutations are handicapped relative to the rest of the population in that they tend to have fewer children or to die earlier. Hence such genes are eventually eliminated—soon if they do great harm more slowly if only slightly harmful. A mildly deleterious gene eventually may do just as much total damage as a grossly or abruptly harmful one because the milder mutant gene persists longer and has a chance to harm more people.

Although many mutations do disturb normal embryonic growth it is not correct that all or even that most mutations commonly result in monstrosities or frenzies. In fact the commonest mutations are those with the smallest direct effect on any one generation—the slightest detrimental. The last remark deals with all types of radiation induced mutations however there are others such as mutations that arise from natural causes. These naturally occurring mutations are usually called spontaneous mutations. As with radiation induced mutations nearly all of the effects of spontaneous mutations are thought to be harmful. It has been stated that about 2 per cent of tangible genetic defects—which include certain mental defects, epilepsy, malfunctions neuromuscular defects and many others—are present at birth or appear before sexual maturity. If man made radiation increases the mutations by a "doubling dose" with an increase from two million defects to four million defects approximately 200 000 new tangible defects should occur in the first generation.

The total dose of radiation is what counts. This statement is based on the fact that genetic damage done by radiation is cumulative. The geneticists also conclude that mildly larger doses of radiation would produce more but not worse mutants.

When a gene  
The gene in  
subsequent cell divi  
then it is  
the mutant gene  
and the  
person in whom the

the effect is a  
the mutation occurred  
even though  
of cellular  
an individual  
genetic in the

are handicapped rela-  
to have fewer  
are eventually  
if only  
may do  
harmful one

normal embryonic growth  
commonly  
most muta-  
the commonest muta-  
deals with

however there are  
These  
usually  
mutations are  
radiation induced

many  
defects and many  
sexual maturity  
by a "doubling  
four million

should  
more but not worse mutants

The genetic importance to a child is the total radiation dose that the child's parents have received from their conception to the conception of the child. It seems sensible to use a round figure of 30 years in this connection, especially since this figure is the one usually chosen to measure a generation.<sup>4</sup>

Most studies on mutation from exposure to radiation has been done on the genes of the mouse and the fruit fly. Unfortunately, geneticists have assumed that mouse and fruit fly statistics apply reasonably well to man. It seems necessary to emphasize this matter of approximate estimation, so that no one will conclude improperly that a statement is unreliable because it involves a range of values. On the contrary, such a statement, when made in a situation like the present one, should be viewed as all the more dependable precisely because it does not pretend to an unwarranted accuracy. Henshaw, in discussing the radiation induced mutants in human beings, stated "With the possibility of irradiation induced mutations appearing so likely, why are abnormalities not seen more often in the offspring of individuals exposed to radiation? Two possible explanations will be offered here and others will become apparent later. First irradiation induced mutations result in changes which are often identical with changes which arise spontaneously, making the detection of abnormalities resulting from exposure to radiation dependent upon statistical evaluations. Some statistical studies have been made but, although a small amount of positive evidence has been obtained the data are so limited they have little meaning. Second, many mutations are recessive in character and, since the possibility of two similar mutant genes coming together in the same individual is very remote at first, the process of production of such genes must be in operation a long time before recessive characters can be manifested in appreciable numbers."<sup>5</sup>

Many scientists have tried to develop the lowest figure that could be responsibly considered an acceptable dose rate. Various arguments reduced the 5 r to 150 r range and several experienced geneticists have recently made estimates in the narrower range of 30 r to 80 r. The National Academy of Sciences recommended "that the general public of the United States be protected, by whatever controls may prove necessary, from receiving a total reproductive lifetime dose (conception to age 30) of more than 10 roentgens of man made radiation to the reproductive cells. Of this reasonable (not harmless, mind you, but reasonable) quota of 10 roentgens over and beyond the inevitable background of radiation from natural causes, we are now using on the average some 3 or 4 roentgens for medical X rays. This is roughly the same as the unavoidable dose received from background radia-

tion." The 10 roentgen recommendation applies in an average sense to the population as a whole.

One should consider the findings of Macht and Lawrence<sup>1</sup> in 5,461 offspring of radiologists and exposed controls, there were 2.56 per cent twins, 14.03 per cent fetal deaths and 6.01 per cent congenital defects. In 4,484 offspring of unexposed controls, there were 2.1 per cent twins, 12.22 per cent fetal deaths and 4.02 per cent congenital defects. Normal offspring constituted 83.23 per cent of the unexposed group, as compared to 80.42 per cent normal offspring of the exposed group. In 328 offspring of radiation exposed fathers, 348 congenital defects were reported, while 229 congenital defects were reported in 216 offspring who were born of fathers unexposed to radiation. All types of defects were reported. Anomalies of the sense organs occurred with greatest frequency among both the exposed and the unexposed groups, and represented 17.53 per cent and 18.34 per cent, respectively of all anomalies reported. The offspring of exposed persons showed a significantly higher proportion of heart blood vessel and blood anomalies than the offspring of unexposed persons. The data given in the Macht and Lawrence report present a picture of first generation effects only. They concluded that the results indicate that small prolonged doses of radiation produce abnormalities in humans.

The problems of radiation protection in diagnostic roentgenology have been discussed carefully by Miller,<sup>2</sup> Henny,<sup>3</sup> and Ritter, Warren and Pendergrass.<sup>4</sup> Only by studying the relatively specific dosages due to diagnostic procedures can we develop a program of reduction of total radiation exposure. (We consider roentgen therapy as being a specific mode of therapy, and its additive ionization a medical necessity.) Fluoroscopic dosages usually amount to 10 to 20 r per minute in air, at the point of entry into the patient's body. It is important to note that most of the dosages given are at the skin in air and do not represent the final dose on the reproductive organs or hematopoietic tissue. For example, in taking an anteroposterior film of the pelvis, 5.3 r at the skin measure only 0.6 r at the ovary exposure. At the other end of the diagnostic range is the usual chest film with only 0.05 r dosage. In securing a gastrointestinal series, the total exposure includes both the fluoroscopy and the film studies. Dental films average about 5 r each. This latter exposure probably means very little genetically as only 0.005 r reaches the gonads.

Changes in instrument design cannot be controlled at this stage by the average practicing radiologist and although the

prospect of new developments in roentgenoscopic image amplification should be mentioned, the primary purpose of this report is to discuss specific methods for avoiding exposure to radiation during the usual radiologic examination.

No data covering large numbers of technicians working in radiologic facilities are available, however, the report of Mecht and Lawrence<sup>2</sup> points up the fact that the training of radiologic personnel is a cardinal requisite in the reduction of exposure to ionizing radiation. Besides the dogmatic teaching of the principles of radiation, instruction in the use of shielding, coning, positioning, and filters, and in the selection of techniques is of great importance. During an exposure, technicians must always move behind a shield. Although distance is a great shielding factor, the habit of specific shielding should not be compromised. Shielding of operating personnel in such procedures as angiocardiography, encephalography, and cardiac catheterization must be adhered to. Good lead aprons will suffice. The use of cones to reduce irradiation other than that essential for the making of roentgenograms is well known. Technicians must be taught to position patients and to utilize correct techniques in order to obtain the best possible film at the first exposure. Repetition of exposures cannot be tolerated with our present apparatus, techniques, and mechanical aids. Close liaison between the radiologist and his technicians in selection of the correct techniques and positions will eliminate multiple exposures. The use of additional filtration such as 1 to 2 mm of aluminum has been well established. Filters should be used in both fluoroscopic and diagnostic machines.

Local shielding of the gonads has been employed in our department with good success. It is well accepted by personnel, readily available, easily accomplished, and detracts only moderately from the diagnostic value of the finished film. It cannot be denied that the male military population can be much more simply protected than can the patients of large city hospitals, in which the sexes examined are more equal in number. Although exposure during an upright anteroposterior examination of the chest is only approximately 0.05 r because of the 72 inch distance, minute amounts of radiation could conceivably affect the gonads. At the present time, a small lead apron made from the usual radiologist's apron is attached at the belt line. This may be of more value in teaching personnel the facts concerning radiation than in actual measurable protection from radiation which according to Chamberlain<sup>3</sup> as reported by Perkins<sup>4</sup> is 0.00025 r to the gonad.

During intravenous pyelographic examination, the testes are shielded quite simply, and this does not detract from the diag-



notic value of the film. We have been unable to devise adequate protection of the ovaries. Use of the shield as in a roentgenographic study is being tried in the low back study which consists of anteroposterior films, oblique films, and spot films of the lumbosacral space in the lateral view. The rule is more readily susceptible to protection in this examination. The number of exposures in the follow up examination of the small bowel study in children have been decreased. Shielding has not retarded the careful perusal of film made periodically during this examination.

The story of the excited grandmother who phoned the radiologist refusing to submit to roentgen ray examination because it might affect her grandchildren through her genes is ludicrous but might serve to highlight several points. One in patients beyond childbearing age the problem of gonadal exposure is actually no real problem and two it should be borne in mind that frequently older patients are those who require the most extensive or prolonged studies. We feel that the older patients in the "cancer state" deserve special diagnostic studies. In a way, the radiation to which this group is exposed falls into the same category as radiotracer "must have" type of medical procedure.

Attention to the physical factors of technique by the roentgen ray technician under the guidance of the radiologist, is another way in which total exposure may be reduced. The changing of high milliamperage to high kilovoltage and low milliamperage techniques substantially reduces total irradiation without loss of diagnostic value of the films. This is of particular value in children in whom because of their small size and the desire to see more on one film large areas are frequently radiated. The use of small fields even in the small child is to be preferred. As mentioned by Henry, the integral dose at 60 kv is 1.1 times as great, and at 50 kv is 5.1 times as great as at 100 kv for the same film density.

Avoidance of any radiographic procedures that might expose the abdomen in early pregnancy should be especially seriously considered. Not only the maternal ovaries but the fetal gonads receive a moderate dose. For example Sowby<sup>11</sup> found that in pelvimetry the fetus received 26.65 r and the maternal ovary 1.25 r while in a pyelogram as much as 3.21 r reached the ovary. Actually so little can be learned by doing pelvic measurements early that this procedure should be reserved until the last trimester when more information may be gained concerning not only the maternal pelvis but also the fetus and placenta.

Production of roentgenograms with reduced exposure by the method of intensification by toning is relatively simple and inex-

pensive, but has not been used advantageously. Intensification may be used when it is necessary to reduce the quantity of the radiation or to use shorter exposure time, or when it is impracticable to use heavy, high powered apparatus. We are also using this method to render interpretable those films that were technically impossible to study.

The advantageous use of fluoroscopy and the selection of films to be made must be reviewed. In the past, multiple films and spot films "for the record" were made as a backup procedure in many clinics. It is much more important that careful selection of positive as well as negative findings be made and that the number of exposures be reduced. In our present state of enlightenment, the old procedure of taking many films in the hope of finding a diagnosis must be abandoned. Equally as important as selection of technique and reduction in number of films is avoidance of repeating examinations. Technicians particularly, and radiologists also, must avoid the pitfall of having "another look" if the diagnosis is not altogether clear, or of satisfying the human whim of getting perfect pictures on the celluloid. Excellence in technique, not repetition is the answer to this problem.

Lastly, a few words on education with respect to irradiation. A scare program can be very detrimental to good diagnostic roentgenology. Data from those qualified to speak should be made available and publicized. Early education of technicians and patients is mandatory and acceptable in this atomic era.

Most of the procedures outlined above are practiced daily by competent radiologists and their technicians. Awareness and continuation of good, sound practices that have been used for years by radiologists are probably the only methods for reducing diagnostic irradiation at the present time. A survey of each diagnostic, radiologic department is indicated. Based on the number of exposures of various types, reduction can be concentrated in specific directions. Special effort must be expended toward reducing irradiation in examinations involving exposure of the gonads primarily; studies of the lumbar spine, pelvis, coccyx, hips and upper femur; and fluoroscopic examinations of the gastrointestinal tract, urinary tract, and reproductive tracts, as well as visualization of the gallbladder, spleen, and liver.

In this small Air Force hospital, roentgen exposure and sites by frequency of occurrence include chest, hands, feet, ankles, knees, and wrists, in the order listed. The experience in each department may indicate that the problem of reduction of irradiation is not as urgent as previously considered. Exposure to the gonads is considered inherent in the examination of the lumbar spine, pelvis, coccyx, hips, and femur, in pelvimetry, gastro

intestinal examination and examinations of the urinary tract. Actual measurements in our laboratory are not inconsistent with findings at larger teaching institutions, and show that changes in technique to include high kilovoltage and low milliamperage, as well as diminution in the number of films will reduce the total amount of ionizing irradiations to the gonads.

This subject has been of such general interest to the public and the medical profession that, writing in the lay press, Dr Dwight H. Murray, then President of the American Medical Association, stated "Control and standardization of the way X rays are being used in medicine today are in the hands of highly skilled specialists known as radiologists. When X rays, radium and the radioactive substances, such as isotopes are used by specially trained doctors of medicine they can be termed safe although there is some risk in every form of medical or surgical treatment. The hazards of radiation therapy are extremely small however, in the less serious diseases. They are one of medicine's great gifts both in treatment and cure. In the hands of skilled radiologists they promise to give you added years of comfort and life."

### SUMMARY AND CONCLUSIONS

A review of current scientific and medical pronouncements on the effects of ionizing radiation has been made and modern radiologic practices have been examined. The following conclusions have been reached: (1) With the knowledge that we already have we can adequately protect both patients and personnel by the proper use of cones, diaphragms, filters, accurate technique, short exposure time and the proper use of shielding. (2) Medical use of ionizing irradiations for diagnosis and therapy has been well established. (3) Alteration of the genes in the gonads by mutation is known to occur and by approximate estimates can be referred to man. (4) Total irradiation of patients is cumulative and must be reduced. (5) From the diagnostic radiologic standpoint total irradiation may be reduced by a renewed awareness of the best radiologic technique and practices used at the present time.

### REFERENCES

1. United Nations Scientific Committee on Effects of Atomic Radiation. *Us of X rays and other ionizing radiation: responsibility of medical profession*. U. S. Armed Forces M. J. 8: 358-360, Mar 1957.
2. Quamby, E. H., and Lawrence, G. C. Technical Bulletin, No. 1. Radiological Society of North America. Standardization Committee Report on Diagnostic Radiology 35: 138-159, Aug 1940.
3. Hershaw, P. S. *Genetic injury*. Radiology 46: 62-65, Jan 1946.
4. National Academy of Sciences. Biological effects of ionizing radiation. Summary reports. National Academy of Sciences. National Research Council. Washington, D. C. 1956.

- 5 Macht S H and Lawrence P S National survey of congenital malformations resulting from exposure to roentgen radiation *Am J Roentgenol* 73 442-466 Mar 1955
- 6 Miller R W Some potential hazards of use of roentgen rays in pediatrics *Pediatrics* 11 294-303, Mar 1953
- 7 Henny G C. Radiation protection problems in diagnostic roentgenology *Am J Roentgenol* 73 649-654 Apr 1955
- 8 Ritter V W Warren S R Jr and Pendergraas E P Roentgen doses during diagnostic procedures *Radiology* 59 238-251 Aug 1952
- 9 Perkins J E Importance of chest x ray in total radiation exposure *Tuberculosis Abstracts* 30 1 Jan 1957
- 10 Sowby F D Lecture Radiation Services Occupational Health Division National Health and Welfare Department of Canada
- 11 Blake R A, Roderick J F and Umberger J Q Intensifications of Radiographs by Toning F I DuPont de Nemours & Co Inc Photo Products Department Wilmington Del
- 12 Murray D H Are x rays dangerous to you? *American Weekly* Jan 6 1957
- p 2
- 

### SARCOIDOSIS AND PREGNANCY

"In following the course of 10 patients with sarcoidosis through 16 pregnancies, it was observed that pregnancy appears to have an ameliorating effect on sarcoidosis during the prenatal period but that this benefit is frequently lost after delivery. All the patients tolerated pregnancy well, however, there were two abnormalities of pregnancy and three fetal abnormalities noted in the 16 pregnancies. The observed improvement of the sarcoidosis during pregnancy might constitute evidence against tuberculosis being the etiology of sarcoidosis since pregnancy does not improve, and may even aggravate tuberculosis. It is possible that improvement of sarcoidosis during pregnancy is due to the increase in production of corticoids by the adrenal glands during gestation."

—ROBERT L. MAYOCK, M.D.

ROBERT D. SULLIVAN, M.D.

ROY R. GREENING, M.D.,

RALPH JONES, Jr., M.D.

in *Journal of the American Medical Association*

p 158 May 11 1957

intestinal examination and examinations of the urinary tract. Actual measurements in our laboratory are not inconsistent with findings at larger teaching institutions and show that changes in technic to include high kilovoltage and low milliamperage, as well as diminution in the number of films will reduce the total amount of ionizing irradiations to the gonads.

This subject has been of such general interest to the public and the medical profession that, writing in the lay press, Dr Dwight H. Murny, then President of the American Medical Association, stated "Control and standardization of the way X rays are being used in medicine today are in the hands of highly skilled specialists known as radiologists. When X rays, radium and the radioactive substances, such as isotopes, are used by specially trained doctors of medicine they can be termed 'safe' although there is some risk in every form of medical or surgical treatment. The hazards of radiation therapy are extremely small, however, in the less serious diseases. They are one of medicine's great gifts both in treatment and cure. In the hands of skilled radiologists they promise to give you added years of comfort and life."

### SUMMARY AND CONCLUSIONS

A review of current scientific and medical pronouncements on the effects of ionizing radiation has been made and modern radiologic practices have been examined. The following conclusions have been reached: (1) With the knowledge that we already have we can adequately protect both patients and personnel by the proper use of cones, diaphragms, filters, accurate technic, short exposure time and the proper use of shielding. (2) Medical use of ionizing irradiations for diagnosis and therapy has been well established. (3) Alteration of the genes in the gonads by mutation is known to occur and by approximate estimates can be referred to man. (4) Total irradiation of patients is cumulative and must be reduced. (5) From the diagnostic radiologic standpoint total irradiation may be reduced by a renewed awareness of the best radiologic technic and practices used at the present time.

### REFERENCES

- 1 United Nations Scientific Committee on Effects of Atomic Radiation. *Us X-ray and therapeutic radiation report*. U. S. Armed Forces Medical Journal 358:360 Mar 1957.
- 2 Quimby E. H. and L. W. G. C. *Technical Bulletin, No. 1*. Radiological Society of North America Standards Committee. Reprinted from Radiology 35:138-139 Aug 1940.
- 3 Henshaw P. S. *Gynecology and Radiology* 46:62-65 Jan 1946.
- 4 National Academy of Sciences. *Biological Effects of Atomic Radiation*. Summary reports. National Academy of Sciences National Research Council Washington D. C. 1956.

October 1957)

## REDUCTION OF IONIZING RADIATION

1475

- 5 Nacht S H and Lawrence J S National survey of occupational malnutrition resulting from exposure to ionizing radiation *Am J Roentgenol* 73 444-447 Mar 1955
- 6 Miller R W Some potential hazards of use of ionizing rays in pediatrics *Pediatrics* 11 294-303 Mar 1953
- 7 Henny G C: Radiation protection problems in diagnostic treatment *Am J Roentgenol* 73 649-654 Apr 1955
- 8 Ritter V W Warren S R Jr and Pendergrass E P: Roentgen diagnosis and diagnostic procedures *Radiology* 59 239-251 Aug 1952
- 9 Perkins J F Importance of chest x-ray in total radiation exposure *Tubercu* 115 Abstracts 30 1 Jan 1957
- 10 Cowby F D Lecture Radiation Services Occasional Health Division, Health and Welfare Department of Canada
- 11 Blake R A Rodetick J F and Lebesque J Q Intensification of Fluorography by Toning E I DuPont de Nemours & Co Inc Photo Products Department Wilmington Del
- 12 Murray D H Are x-rays dangerous to you? *American Weekly* Jan 6 1957 p 2

## SARCOIDOSIS AND PREGNANCY

"In following the course of 10 patients with sarcoidosis through 16 pregnancies, it was observed that pregnancy appears to have an ameliorating effect on sarcoidosis during the prenatal period but that this benefit is frequently lost after delivery. All the patients tolerated pregnancy well however, there were two abnormalities of pregnancy and three fetal abnormalities noted in the 16 pregnancies. The observed improvement of the sarcoidosis during pregnancy might constitute evidence against tuberculosis being the etiology of sarcoidosis, since pregnancy does not improve, and may even aggravate tuberculosis. It is possible that improvement of sarcoidosis during pregnancy is due to the increase in production of corticoids by the adrenal glands during gestation."

—ROBERT L MAYOCL M D

ROBERT D SULLIVAN M D

ROY R GREENING M D

RALPH JONES Jr M D

in *Journal of the American Medical Association*  
p 158 May 11 1957



## Clinicopathologic Conference

William Beaumont Army Hospital Fort Bliss Tex \*

### HEADACHE AND INTERMITTENT PARESIS

**Summary of Clinical History** A 45 year old white woman had a sudden onset of sharp severe, throbbing right temporal head ache on the morning of admission to this hospital. The headache remained severe was made worse by any movement and was not particularly relieved by anything including aspirin. Shortly before admission she began noting slurring of speech and equal weakness of the left arm and left leg causing unsteadiness of gait. She did not lose consciousness. There had been no previous paresis syncope anesthesia or memory loss.

The patient had pneumonia in 1950, possibly associated with pleural fluid, and followed by a chronic cough productive of dark thick material but without hemoptysis. The patient was known to have hypertension since 1949. She also had had exertional dyspnea and ankle edema for the past year and a half. The patient had been unconscious for a very brief interval following an automobile accident in 1948. She was released from a hospital in a few days.

**Physical Examination** The patient was a well developed, fairly well nourished white woman who was somewhat lethargic had slight dysarthria and complained of severe right temporal head

At the time of the conference Col Ab Zehm MC USA was Commanding Officer  
From the Laboratory Service Maj Joh A Furst MC USA Chief of the Laboratory Service  
Honor Hospital Erie Pa

her pulse rate was 81 per minute and her blood pressure 184/110 mm Hg. The optic disks were normal. The fundic arterioles were spastic with a 1:1 venous arteriole ratio. No hemorrhages or exudates were noted. The teeth were partially absent and the gums appeared unhealthy. The tongue deviated to the left and a gag reflex was present. The breasts were normal. The lungs were slightly hyperresonant to percussion and had coarse rales throughout. Examination of the posterior chest was unsatisfactory because the patient was in decubitus position. The point of maximal cardiac impact was palpable and visible 10 cm from the midsternal line in the sixth intercostal space. The mitral first sound was widely split. The liver was palpable two to three fingersbreadth below the right costal margin. There were no abdominal masses or tenderness. A lower abdominal scar was well healed. Neuromuscular reflex reactions were right biceps 2 plus, left 3 plus, right triceps 2 plus, left 3 plus, right knee jerk 2 plus, left 3 plus, right and left ankle jerk, 0, absent Babinski bilaterally, and Gordon and Oppenheim both 1 plus bilaterally. There was left facial paralysis, and weakness and flaccidity of the left arm and leg.

**Laboratory Studies** The urine had a neutral reaction and normal albumin and sugar. Microscopic examination of the urine disclosed many epithelial cells, 3 to 5 white blood cells, and an occasional red blood cell per high power field. White blood cell count was 10,200/ $\mu$ l, with 71 per cent neutrophils (6 per cent band forms), 22 per cent lymphocytes, and 7 per cent monocytes. The red blood cells numbered 4,680,000/ $\mu$ l and the hemoglobin was 13.2 grams/100 ml. The spinal fluid three days after admission was clear with a cell count of 237 white blood cells/ $\mu$ l (10 per cent neutrophils and 90 per cent lymphocytes), total protein of 100 mg/100 ml, colloidal gold 1:12333110, and the serologic test for syphilis was negative. A blood cardiolipin test was negative. Six days after admission the spinal fluid was clear with a white blood cell count of 45/ $\mu$ l, sugar, 55 mg/100 ml, total protein, 72 mg/100 ml, colloidal gold, 0001220000, and chlorides, 729 mg/100 ml.

A roentgenogram of the chest disclosed normal lung fields. The bones of the skull were normal on a roentgenogram. A calcified pineal was in normal position. A deep Q wave in lead III on an electrocardiogram was probably positional, in absence of significant Q wave in lead aVF. A slightly prolonged Q-T interval suggested myocardial disease or uremia.

**Course in Hospital** The morning after admission the patient had involuntary urination and defecation, but had called for a bathroom. Her left arm and left leg gradually increased in strength.



The headaches gradually decreased in severity and she became more alert so that upon discharge she was able to walk and could talk intelligently. There was however a residual headache. She was given a rice diet and the blood pressure dropped, at the time of discharge it was 110/70 mm Hg. The trend of the findings on spinal fluid examination indicated a vascular disorder. She was instructed to remain on the rice diet and take 30 mg of phenobarbital four times daily, 90 mg of papaverine three times daily, and a multivitamin preparation once daily.

Fifteen days after this first admission the patient was seen in the receiving office. It was obvious that she was no better than she had been previously. Neurologic examination failed to reveal any progression of signs. The pupils were extremely small and it was believed that the patient might have been taking heavy medication for her severe headache. She was admitted for a detailed neurologic study. On this admission, the patient stated that her mother had died with a similar paralysis. That evening the patient was able to walk with support. The next morning she was very lethargic and unable to converse intelligently. Her blood pressure was 210/100 mm Hg and her pulse 72 per minute. There was Cheyne Stokes respiration and she was incontinent. The neurologic examination had changed in that the right pupil was widely dilated and the patient had vomited. A blood bromide level on this second day was 15 mg/100 ml. The patient died quietly the day after admission.

### DISCUSSION

**Doctor Schoerer:** This 45 year old white female patient was admitted with a history and a clinical picture that would immediately suggest a diagnosis of a stroke. Her past history shows that she had pneumonia in June 1950 from which she recovered. Furthermore the patient had been a known hypertensive since 1949. During the past year and a half she had exertional dyspnea and ankle edema which together with the fact that her liver and heart were moderately enlarged would seem to suggest early congestive heart failure. The terms *apoplexy*, *CVA* and *stroke* are used interchangeably in describing a picture such as the one presented by this patient. These terms merely imply that something of sudden nature has happened in the patient's central nervous system causing him or her to be paralyzed. The term *CVA* indicates that this "something" was accidental in nature which in most cases is incorrect. *CVA* is an ugly abbreviation which should be dropped from our vocabulary. All of these terms tend to lull the physician into a state of mind where he assumes to have established a satisfactory diagnosis usually resulting in therapeutic nihilism of prescribing vitamins and some

vasodilating drugs of questionable value. One should keep in mind that many conditions may give rise to similar neurologic syndromes and that the neurologic signs and symptoms merely tell where the lesion is but not what the lesion is due to.

The differentiation of the cause of the clinical picture has become more important in recent years since depending on the exact underlying process different measures will have to be instituted. Sudden onset of severe throbbing headache followed within a matter of hours by symptoms of paralysis almost certainly indicates vascular disease. We now shall consider the differential diagnosis of cerebral vascular disease with major neurologic symptoms. Differential diagnosis as to pathogenesis is fairly simple, but the etiologic possibilities are myriad. Disturbances in circulation are by far the most common of all the organic cerebral diseases. Spontaneous cerebral vascular lesions rank third or fourth among the causes of death in the United States. The pathogenic mechanisms involved can be reduced to four main ones: first, thrombosis, second hemorrhage, third embolism and fourth, so called vasogenic encephalopathy characterized by histologic findings of ischemic damage to the brain tissue without obvious occlusion of any large blood vessels.

The clinical pictures presented by these mechanisms are very similar. The difference is more a quantitative than a qualitative one. The most common of the four mechanisms is thrombosis followed by hemorrhage, and embolism the least frequent. Vasogenic encephalopathy is probably more common than usually realized and may be even more common than thrombosis. Most valuable information as to type of lesion is to be obtained from an accurate history. Prodromal symptoms, for instance, may be absent in embolism. In thrombosis and hemorrhage they are very similar. Both categories may produce headache, dizziness, and paresthesias.

In thrombosis chronic personality changes may be more common than in hemorrhage whereas in the latter, vomiting, convulsions, loss of sphincter tone and loss of consciousness are frequently encountered at the time of actual hemorrhage. Thrombosis in the absence of prodromal symptoms with a sudden dramatic onset may simulate hemorrhage. One would expect vasogenic encephalopathy to produce the mildest picture of the three but again cases have gone on to actual death without any histologic evidence of thrombosis but with the picture of diffuse ischemia of the brain. The most common causes of thrombosis are arteriosclerosis, syphilis, arteritis obliterans, periarthritis nodosa, polycythemia, sickle cell anemia, leukemia, and shock. The resulting tissue damage is characterized by softening and edema of the brain tissue at times simulating the picture of a tumor. Thrombosis is seen somewhat more frequently in males than in females and occurs most commonly during the fifth and sixth decades. Hemorrhage and hypertension with or without arteriosclerosis is often seen.

Vascular disease without hypertension and trauma aneurysm vascular tumors and blood dyscrasias must be considered particularly if faced with a young individual aneurysm is a serious consideration. At times it may be almost impossible to decide whether one is dealing with a hemorrhage into an infarcted area or with a primary hemorrhage. In hemorrhage the initial lesion may be intimal hemorrhage into the cerebral vessel wall similar to those seen in coronary vessels. A distant perivascular extravasation in the pons and medulla probably is merely a reflection of the suddenness and violence with which the pathologic event causes a sudden increase in intracranial pressure followed by temporal lobe herniation and possibly a cerebellar herniation.

Vasogenic encephalopathy is commonly seen in patients with either hypertensive arteriosclerosis or renal disease. It is thought that the ischemic changes found are the result of vascular spasms or the result of sudden drops in blood pressure as for instance in patients with myocardial infarction or patients in severe shock. Angiographic studies in patients with aneurysms have demonstrated vascular spasm to occur commonly in blood vessel receiving the aneurysm. Focal signs in patients with subarachnoid hemorrhage due to ruptured aneurysm may be due to hemorrhage into cerebral tissue or and probably more common due to spasm in the neighboring arteries. In cases where such vaso spasm leads to permanent functional loss one would have to assume that a protective mechanism has overshot its goal.

Sudden cerebral symptoms which tend to improve also occur in the following conditions which have to be considered in the differential diagnosis. (1) Subdural and extradural hematomas in the absence of a traumatic history would not be very high on the list although chronic subdural hematoma may occur without history of trauma. These patients usually present histories of chronic headache. Their condition shows fluctuation and actual neurologic changes occur more or less gradually. (2) A malignant infiltratively growing brain tumor may exist for considerable time without causing any symptoms. Sudden hemorrhage into the tumor tissue may simulate a mere brain hemorrhage. Some of these tumors are also known to have a tendency to cause thrombosis. The main feature of thrombosis or hemorrhage with brain tumor would be progression of disease rather than a tendency to improve following the initial attack. The possibility of brain tumor would have to be seriously considered in our case. (3) Brain abscess has a tendency to simulate brain tumor. Not infrequently the patient shows evidence of a focus of infection such as bronchiectasis however brain abscess if well encapsulated may not cause a febrile picture. Changes in the spinal fluid such as marked pleocytosis are commonly seen the blood picture most commonly shows a definite increase of the white cell count as seen with abscesses elsewhere in the body. (4) Postconvulsive paralysis usually does not present any diagnostic difficulties in

the face of an epileptic history (5) Multiple sclerosis rarely may simulate an apoplectic attack (6) Adams Stokes syndrome (7) Carotid sinus syncope (8) Extracranial carotid thrombosis This last condition definitely enters into differential diagnoses The symptoms produced by it are very protean and range from almost nothing to severe mental deterioration the typical picture being a hemiparesis with unilateral blindness the clinical picture depending entirely on the possibilities of collateral circulation in a given case (9) In a comatose patient diabetic uremic and hypoglycemic coma must be considered (10) Poisonings particularly lead poisoning may lead to vascular disease and hypertension which in turn may cause one of the mechanisms previously discussed

In addition to the history and physical and neurologic examinations it may become necessary to have blood and urine, blood chemistry, cerebrospinal fluid, electroencephalographic angiographic and air studies in order to pin a certain cause to any given clinical picture We may now examine our protocol as to possible clues to the cause, but we are not very richly rewarded There is hardly any doubt that the underlying mechanism is a vascular one and as far as mechanism is concerned we will have to consider thrombosis, hemorrhage, and vasogenic encephalopathy Since there is no obvious source of embolism I think we can rule this out Thrombosis, hemorrhage, and hemorrhage in to a brain tumor are all good possibilities The absence of a bloody spinal fluid is more in favor of thrombosis The fact that the calcified pineal is in a normal position makes the presence of a brain tumor rather unlikely although a brain tumor of infiltrative type may not cause a shift of the pineal

The laboratory data show some spinal fluid abnormalities which demonstrate a tendency to clear up between the third and sixth day of the first hospitalization and are such as very well may be seen with ischemia to brain tissue They do not seem to be diagnostic The neurologic examination merely indicates that the right hemisphere is involved The neurologic picture presented is not characteristic of occlusion of any particular intracerebral artery The patient was a known hypertensive and as such was predisposed to either thrombosis or hemorrhage The possibility that this patient may have had an aneurysm that at first merely caused vascular spasm and finally ruptured also has to be considered Syphilis as a possible cause of thrombosis may be ruled out in the absence of positive serologic reaction and a colloidal gold curve which in the spinal fluid obtained on the third day of hospitalization showed a mildly parenchymatous type of curve and within three days went back to normal without any specific therapy The patient died in a manner indicating sudden increase of intracranial pressure in the right hemisphere, respiratory failure, temporal lobe herniation and possible cerebellar herniation Again this could be the result of massive thrombosis or hemorrhage

On the basis of information contained in this protocol we can merely state that this patient died of a sudden increase of pressure in the right hemisphere most likely as a result of massive edema secondary to ischemia produced by vascular occlusion.

#### Dr. Schoerer's diagnosis

Cerebral vascular occlusion of undetermined origin

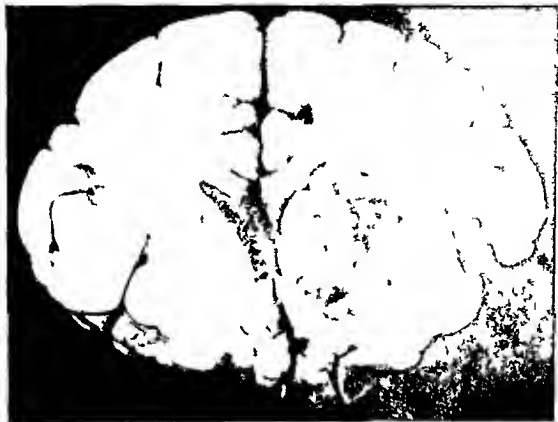
Doctor Lopez: I noticed in the cerebrospinal fluid findings that the chlorides were at least in the upper limits of normal and the sugar low. That together with 90 per cent lymphocytes causes me to think that it is due to syphilis or tuberculosis. A tuberculoma is possible.

Doctor Leland: I think everything points to syphilis except the cerebrospinal fluid. Serology was negative but I do wish to call attention to the fact that a gold curve high in the middle is known as a luetic curve in the old classification.

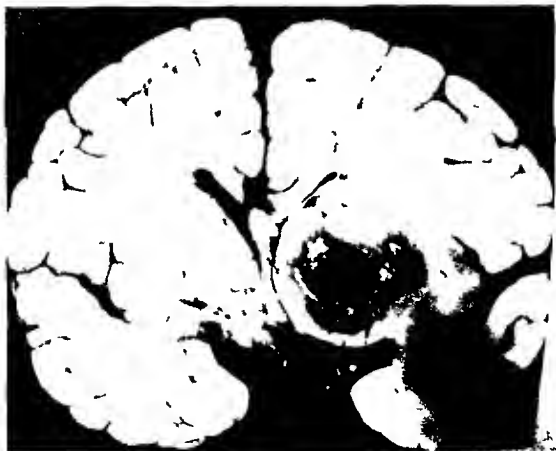
### PATHOLOGIC FINDINGS

Doctor Fust: I would like to thank Major Schaerer for trying to make a silk purse out of a sow's ear. We are all perfectly aware that it is difficult if not impossible to put a finger on the precise cause of death in this patient. I think only one who has seen such a case would be able to include it in a differential diagnosis and even then not with any great degree of certainty. Aside from severe pulmonary congestion and edema and the little bit of atherosclerosis that was generalized, the significant findings were in the brain. The gyri and sulci of the cerebral hemisphere were found to be a little more flattened than those on the other side. You can see in the area of the internal capsule (fig. 1) this large defect made up mainly of abscesses which range in diameter from 0.5 to 3.0 cm.

Cavitation occurs somewhat posterior to the area you have just seen (fig. 2). The abscesses contained grayish brown or bright yellow necrotic material. Microscopically a polymorphonuclear leukocytic reaction is seen at the centers of the necrosis. Somewhat peripheral to this are areas of chronic inflammation mainly centered around small blood vessels. There are giant cells in the pus usually near or around nonseptate hyphae (fig. 3A). When we say nonseptate we mean that you can look along this tube (fig. 3B) and see no divisions. This is a characteristic of the family Mucoraceae which is made up of several genera including mucor and rhizopus both of which are thought to cause disease in man probably with recently increasing frequency. We cannot distinguish between rhizopus and mucor in the tissue but we can culturally. Mucormycosis as a disease of man usually involves the lungs or central nervous system. Some of the cases appear to have been caused by species of mucor others by species of rhizopus. We



*Figure 1 Abscesses in the right cerebral hemisphere*



*Figure 2 Cavitation in the cerebral abscess.*

may call the disease mucormycosis in either event because of the familial name



Figure 3 (A) Multinucleated giant cells engulfing fungi ( $\times 400$ ) (B) No septate Mucoraceae ( $\times 600$ )

Bauer and associates<sup>1</sup> described 2 cases of mucormycosis and collected 9 others. Of these, 6 certainly had diabetes, 1 had hemochromatosis, and 1 was a possible diabetic. There is a triad of symptoms in the majority of cases but as is true of most clinicopathologic conferences, not in this case. The triad includes ophthalmoplegia, evidence of meningoencephalitis, and diabetes mellitus. Bauer and associates thought that the sinuses are the point of entry in cerebral cases. The organisms are sometimes called "sugar fungi" because of their ability to break down carbohydrates, and Garrett<sup>2</sup> was quoted as saying





The fungi have the peculiar ability to invade apparently healthy arteries with subsequent arteritis and thrombosis. The most significant pulmonary lesion is actually infarction due to thromboarteritis. There is no mention of it in the protocol of this autopsy but many of the cranial cases have had extensive thrombosis of internal carotid arteries in addition to the smaller areas of arteritis within the brain. This is in keeping with Major Schaerer's idea that thrombosis with subsequent cerebral edema occurred in this case. Figure 4A shows such an inflamed artery with thickened wall and incipient thrombus. I cannot see any organisms here but chances are that with other stains they would be apparent in the arterial wall.

Figure 4B demonstrates a vessel in which there is a giant cell that almost surely indicates that there are organisms within this vessel. The fact that only a few such cases have been reported does not mean that this is as uncommon. I have seen two unreported cases and there have probably been many unrecognized ones. There will be more. If you want to remember the classical case think of someone with ophthalmoplegia, diabetes mellitus, and symptoms of meningoencephalitis. You cannot do much for him. You can give him iodides and treat his diabetes. Those who have the cerebral form of the disease die. Apparently others who have had diabetes and the pulmonary form of the disease have recovered with control of the diabetes.

### Pathologic diagnosis

#### Cerebral mucormycosis

### REFERENCES

1. Bue H, Ajello L, Adams E, and Hrandz D. U. Cerebral mucormycosis: pathogenesis of the disease and description of fungus *Rhizopus oryzae* isolated from fatal cases. *Am J Med* 18: 822-831 May 1955.
2. Garritt S. D. Ecological group of soil fungi: survey of substrate relationships. *New Phytologist* 50: 147-166 1951. Cited in reference 1.
3. Baker R. D. Pulmonary mucormycosis. *Am J Pathol* 32: 287-313 Mar 1956.

# ACCURACY OF PREDICTION OF MILITARY SUCCESS OR FAILURE

## A Follow Up Study

ROBERT L. WILLIAMS, Major USAF (MC)

ISAIAH M. ZIMMERMAN, First Lieutenant USAF (MSC)

**M**ANPOWER IS a word that has become significant for most Americans. In this technological age, manpower, particularly skilled manpower, is one of our most important national resources. Social or economic planning today requires an assessment not only of time, money, natural resources, but also of the "human factors." The armed services, which even in peacetime constitute one of our large industries, have the continuing task of recruiting, training, and utilizing great numbers of men and women in a wide variety of jobs. The United States Air Force, in this age of jet aircraft, guided missiles, and nuclear warfare, has an unusually large demand for skilled manpower.

Each generation has had its own selection techniques for choosing men for its specific tasks. The expansion in industrial activity which began with World War II has created a demand for increasingly precise selection procedures. In the past, selection often depended on such factors as trade or guild affiliation, social status, or physical prowess. The industrial complex of today requires many technicians to manage its controls. A keen analysis of the skills of each potential recruit is needed. Waste in terms of maladaptation to the job is increasingly costly. Vast sums are spent on recruiting.

Various devices have been used in recent years to select manpower. Screening efforts probably reached their peak during World War II when as many as 40 per cent<sup>2</sup> of the potential inductees for the armed services were declared unsuitable for psychiatric or psychological reasons. The project to be discussed in this article is an evaluation of one of the familiar manpower screening procedures.

---

Presented on 16 May 1957 at the meeting of the American Psychiatric Association in Chicago III.

From Office of The Surgeon General, Department of the Air Force, Washington 25 D. C.

The rapid rebuild up of the Air Force which began with the Korean hostilities revived an urgent requirement for the screening and selection of large numbers of men for combat and combat support. This need appeared to be more critical than during World War II because of the technological advances that had occurred in the interim. Although much had been written about screening during the years of World War II there appeared to be no clear cut answers as to the effectiveness of previous efforts. For that reason the evaluation project to be described in this article was undertaken.

### SCREENING OPERATION

During the period under study the typical Air Force recruit was subjected to an analysis as follows:

He was examined physically and given an enlistment screening test designed to evaluate his learning ability. He was queried as to a possible criminal record. The Armed Forces Qualification Test (AFQT) was administered to estimate his intelligence and adaptability level. At the basic training center a second supplementary physical examination was performed, and he was also tested with a job aptitude battery. During this "processing" there was no formal psychiatric evaluation except that which might have occurred during the physical examination if the suspicions of the examiner were aroused by the recruit's behavior or statements.

In 1953 a new two step operation was inserted into the training program in order to fill the need for an evaluation process designed for prediction of psychological suitability.

The first step was a paper and pencil personal history test containing some 30 "open end" queries as to personal interests and dislikes, forced choice questions and phrases requiring completion. Certain of these items were "weighted" as to their diagnostic "clue" value. If the recruit responded to four or more of these "suspicious" items he was referred to the Mental Hygiene Consultation Unit for a psychiatric evaluation.

The Mental Hygiene Consultation Unit served as the second step of this screening operation. The Unit was situated in a building within the basic training area. It was staffed by psychiatrists, social workers and psychologists. Recruits referred through the medium of the personal history questionnaire received standard psychiatric work ups including interviews with the psychiatric social worker, projective tests and one or more interviews with a psychiatrist. This second phase of the operation was necessarily limited in time by the 11 week basic training period.

At some point during evaluation, the Consultation Unit psychiatrist assigned an "S" profile number to the trainee under the Armed Forces physical profiling system, commonly referred to as "PUMPS." The S category refers to the psychiatric profile. Designation of an S-1 or S-2 amounted to a prediction that the recruit would remain psychiatrically fit for military duty. An S-3 or S-4 profile indicated that as the result of both steps of this screening operation, a recruit was considered to have a personality disorder which would be likely to incapacitate him for effective performance of military duties.

### ASSUMPTIONS

It was assumed, from common experience, that a certain percentage of airmen would fail to meet the standards of performance required of them. Experience had also shown that most of the failures in performance usually manifest themselves in the initial phase of training. A certain number of recruits were definitely disqualified and destined for discharge. Another group was fully qualified and likely to succeed, success being defined as retention in the service during the period of study, which in most cases was about six months. A third group was assumed to exist which was "probably qualified" for success under the same standard. The latter borderline group was regarded as capable of succeeding if given brief supportive psychotherapy. All three groups were presumed to be identifiable by means of the two phase screening effort, i.e., the personal history report and the Consultation Unit psychiatric evaluation. Each man was labeled a 1, 2, 3, or 4 under the S of the profile system.

### METHODOLOGY

The setting for the study was a large Air Force basic military training center. For the purpose of this study the first 341 airmen who were given the profile S-3 or S-4 as a result of the two step psychiatric evaluation constituted the project group. The label of an S-3 or S-4 profile indicated that these airmen were expected to fail in military service because of psychological unsuitability. To evaluate these predictions, each one of these men was "tagged" and followed for the next several months.

A control group of individuals labeled S-1 was selected and matched to the project group. This matching included the selection of a "running mate" for each projectee from the same training group, from a similar geographic area, and of the same relative level of intelligence. The military history of each member of the two groups was investigated. Every airman was followed for the purposes of this study for at least four months. Some earmarked early in the study were followed for nine months. Thus, each airman in the two groups was observed within these vari-

ing periods of time after completion of basic training. His commander was queried as to whether the subject had remained on duty and if not, what disposition had been made. If he had remained on duty, a statement about his effectiveness was requested. The commanders queried were told that the evaluation was merely a routine spot check on the careers of a random sample of airmen. No reference was made to the S profile.

It should be noted that the majority of the project group was composed of individuals with character disorders hence their disposition was the responsibility of the line commanders and they were not handled by medical disposition. The commander could and often did disregard the predictions of the psychiatrist. Frequently the man had to demonstrate his disorder by non effectiveness or by antisocial behavior before any action was taken. This in part accounts for the varying periods of time during which the predicted failures "survived" on active duty. Throughout the study an attempt was made to insulate psychiatric prediction from disposition decision.

#### FINDINGS

In the project group (fig 1), 154 men (45.1 per cent) were discharged at the basic training center or at the next base, were absent without leave (AWOL) or confined at the time of the study.

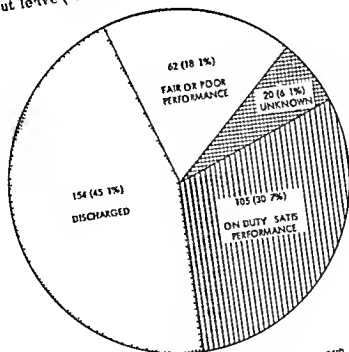


Figure 1 Performance and duty status of the project group (with S 3 S 4 labels) of 341 men.

In addition, 62 men (18.1 per cent) were rated as fair or poor performers by their commanders at their permanent duty station. Thus, 63.2 per cent of the project group could be labeled for confirmed or potential failures. Only 105 men (30.7 per cent) remained on duty and were rated as satisfactory by their commanders. The fate of 20 men (6.1 per cent) is unknown. Contrasting with the control group (fig. 2). In the control group, 33 (8.7 per cent) were discharged, or AWOL, or confirmed failures.

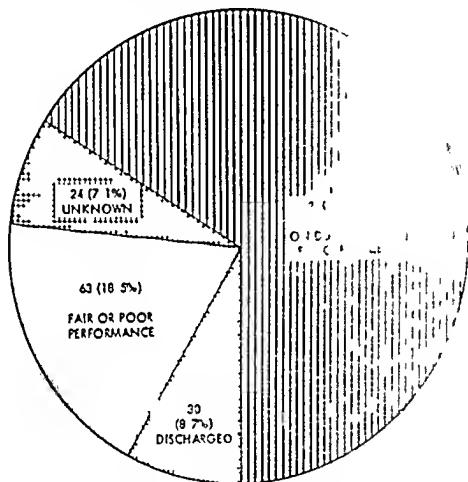


Figure 2 Performance and duty status of the control group (with S-1 labels) of 341 airmen

men (18.5 per cent) were rated as fair or poor performers at their next base. Thus a total of 27.2 per cent could be considered failures or potential failures. It should be noted that the percentage of confirmed failures (i.e., discharged) in the control group was 8.7 per cent. Thus in the control group, 224 men (65.7 per cent) remained on duty and were rated as satisfactory in performance.

Hospitalization during the basic training period also presented a contrast (fig. 3). Fifty-three men in the project group were hospitalized in comparison with 15 men from the control group. In terms of costs, project group men cost 1,412 day

in periods of time under was queried duty and if not, was remained on duty, as requested. The command was merely a routine of duty. No ref

It should be noted composed of individual disposition was that they were not handled could and often did trust. Frequently the effectiveness or by taken. This in part which the predicted out the study an action from disposition

In the project project charted at the base absent without leave

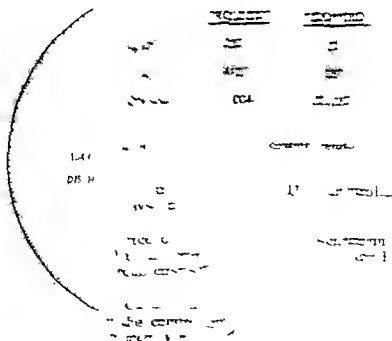


Figure 1 Performance

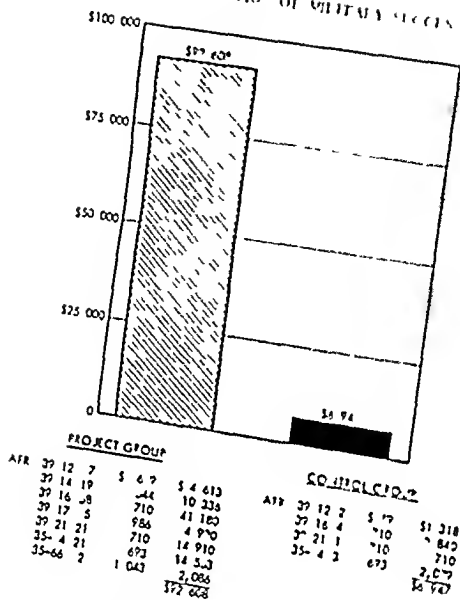


Figure 4 Cost in administratively discharging men of project and control groups

### DISCUSSION

Considering the attrition and/or malfunction rate of both groups, it appears that the prediction of success or failure in military duty as indicated by the S profile was a reasonably accurate forecast. In regard to discharges alone, the project group predictions were correct roughly 6 times out of 10. The control group predictions were correct some 9 times out of 10.

Any conclusions suggested by those findings must necessarily be tempered by the limitations of the setting and by the methodology employed in the evaluation and follow up. The population was small. However, certain questions can be raised. Is a correct prediction of 6 out of 10, as in the project group, efficient enough considering the current manpower pool? What would it cost to raise the successful predictions to 7 out of 10, or 8 out of 10?



It is of interest to note that a fairly conventional psychiatric screening procedure (based on the usual notions of mental health or illness) correlated well with the military administrative "pass or fail" index, utilizing performance as the sole measure. Thus the psychiatric screening procedure is presumably justified because by its use the costly delay in eventual administrative detection of failures is reduced.

It is believed that this small project might be expanded to include a follow up of the rejectees who are released to the civilian community—doubtless to be screened again by industry. Perhaps through some benign method of cataloging the occupational fate of these men the recurring recruiting and training cycle might be unclogged to the advantage of the individual and his technological world.

### SUMMARY

It was assumed that recruits could be tested for "success," "potential success," and "non-success." The standard for non-success was simply discharge from the Air Force. The hypothesis was that by employing a fairly conventional psychiatric screening process (in an abbreviated form under given conditions) it would be possible to predict which men would stay in the ranks and which men would be discharged within six months of reporting on active duty. The study was performed at a large Air Force basic training base. A project group of 341 men was selected as "bound to be unsuccessful" (i.e., discharged). A control group was created of 341 men matched to the project group for characteristics like age, participation in same training unit, marital status, hometown area, et cetera. These two groups were followed at the basic training center and at the next duty station. Throughout the study the decision making on prediction was carefully insulated from the decision making on discharge. The findings were that the psychiatric predictions of "discharge" or "no discharge" were valid to a degree larger than obtainable by chance.

### REFERENCES

1. Garaberg, E. Helm, J. L., and Garaberg, S. W. *Psychiatry and Military Manpower Policy*. King's Crown Press, New York & New York, 1953, p. 1.
2. Strecker, E. A., and Appel, K. E. Psychiatric statistics in two world wars. In *Association for Research in Nervous and Mental Diseases. Military Neuropsychiatry: Proceedings of the Association*, Dec. 15 and 16, 1944. New York: Williams & Wilkins Co., Baltimore, Md., 1946, pp. 38-47.

# USE OF THE MEMBRANE FILTER FOR POTABLE WATER IN THE AIR FORCE

THOMAS C. JONES, Major USAF (MSc)

**T**HE PRODUCTION of potable water under field or combat conditions has always been a problem of major importance to military commanders. Quality of a water supply as well as quantity have been essential to prevent a breakdown of functions at a critical or inopportune moment. "Tactical missions cannot succeed unless troops have enough safe water. Water is even more important than food. Untreated or improperly treated water almost always contains enough disease organisms to make it dangerous to drink. The health of the entire command is in the hands of the water purification equipment operators. They must know their job and do it right."

The United States Armed Forces have met the challenge of providing safe water. Sand pressure filters, chlorine, and halazone tablets were used during World War II to ensure potable water. The water purification set, diatomite, 50 g p m (gallons per minute) capacity, became generally available toward the end of World War II and was used in Asia and the Pacific areas. Diatomite equipment was invaluable during the Korean campaign. These units are now standard Air Force and Army equipment for producing potable water under field conditions, at advanced air bases, isolated sites, at temporary installations, and during emergencies. Complete units are light in weight, readily transportation inside of 8 hours by 3 to 4 men, and are capable of producing up to 60,000 gallons of water per day of practically zero turbidity from almost any surface source that does not contain excessive pollutants of a chemical, salty, or oily nature. The diatomite filter was developed to provide a method that could guarantee absolutely the removal of amoebic cysts and *Schistosoma cercariae* from raw surface water sources. It does this admirably and in addition removes about 90 per cent of the bacteria. Organisms that pass through the filter are killed by chemical disinfection with chlorine.<sup>1, 2</sup>

Submitted in 1957 to the Department of Sanitary Engineering, University of North Carolina, Chapel Hill, N. C., in partial fulfillment of requirements for the degree of Master of Public Health. Maj. Jones is now assigned to Headquarters, Tactical Air Command, Langley Air Force Base, Va.

The question might well be asked how does one know the diatomite filter accomplishes all of this? The filter has been time tested in the field and bacteriologic analyses have been made of the finished water that bear out the claims made for this unit. In many remote or isolated field situations however no bacteriologic laboratory has been available for water quality control. Quality control has been largely of a chemical and physical nature consisting of water reconnaissance surveys, coagulation, filtration and territorial chlorine disinfection. The lack of a light compact and rugged portable laboratory for determining the coliform index of field water supplies has been recognized by medical service preventive medicine personnel and field operators. This problem was largely solved on 31 January 1957 when the Air Force authorized lower echelons to procure membrane molecular filter portable laboratories for field use.<sup>2</sup> It is anticipated that with the portable membrane filter kit available for quality control, water of a quality commensurate with approved municipal supplies will be processed and delivered in the field.

### THE NEED FOR FIELD WATER LABORATORIES

Responsibility for a safe water supply under field conditions is a command responsibility. The Installation Engineers are responsible for the supervision and accomplishment of all work entailed in providing a safe and adequate supply. The Medical Service is charged with the responsibility for conducting investigations to determine the suitability of a supply from the standpoint of health preservation; this in turn requires surveys of sources, treatment measures, collection and analysis of water samples and interpretation of results. The services of a sanitary engineer should be utilized for the evaluation of water supplies whenever possible.<sup>3</sup>

Water for military supplies may be obtained from several types of water sources. Under combat or field conditions and at advance bases it is necessary to use any source that is available. Often this consists of highly turbid and contaminated surface sources such as were encountered in Korea. Providing a safe water in quantity places a great responsibility on the installation engineering noncommissioned officer in charge of the water point. Medical service preventive medicine personnel share this responsibility because on them rests the decision of passing on the quality of the water supplied to all personnel at the forward area. History shows that this responsibility was not taken lightly in World War II and Korea as shown by the low incidence of water borne disease outbreaks that occurred during these conflicts.

In spite of this excellent record control of water quality in the field to a great extent has depended on chemical disinfection.

tion. This was caused in many instances by the lack of adequate laboratory facilities and refrigeration, due to distance, inadequate transportation, the time factor, and in some instances enemy interference. It is a military maxim to regard all water as unsafe until proved otherwise, in other words when in doubt, "don't hesitate, chlorinate."

In situations such as those described above, the portable membrane filter laboratory kit, now available to the Armed Forces, would have been invaluable.

### DESCRIPTION OF THE MEMBRANE FILTER

The membranes used in this technique are basically different from ordinary cellulose filter paper and other types of filtering materials. They consist of a highly porous gel of complex cellulose ester polymers. The membranes have a thickness of about 150  $\mu$  (0.006 inch) and a porosity of 80 to 85 per cent. Under a differential pressure of 70 cm of mercury at 21°C they permit a flow rate of 70 to 80 ml of distilled water per minute through each square centimeter of exposed surface. A 17 mm disk has an effective surface filtering area of 9.6 square centimeters.<sup>4</sup>

Available commercially, the membrane filters vary in size from 0.5 to 9 inch disks and with pore openings varying from extremely small 10  $m\mu$  for virus studies up to 5  $\mu$  for particle sizing using air filtration. A satisfactory filter disk for field use consists of the 47 mm diameter and 0.5  $\mu$  pore size filter disks for use in the field are available with imprinted grids on the surface to facilitate counting. The grid subdivides the surface area so each square represents 1.0 per cent of the effective filtering area.<sup>4</sup>

Portable field laboratory equipment used with the membrane filter disk consists of a 500 ml stainless steel funnel, a stainless steel filter holder (used to support the delicate membrane disk), stainless steel or Pyrex suction flask, clamps, thermometer, valves, suction pump, flaming lamp, stamp collector's forceps for handling membrane disk, small scissors, distilled water, an incubator, and a vacuum bottle or an incubator vest. The equipment listed plus necessary media and supplemental reagents come in the packaged field kit weighing between 26 and 30 pounds.<sup>1-7</sup>

The evaluation of bacterial concentrations in water by means of the membrane filter technique involve five principal steps: (1) separation of the bacteria and other suspended matter from the water sample, and their collection on the upper surface of the membrane filter disk, (2) impregnation of the disk with nutrient liquid from a prefabricated pad to provide for total or differential culturing of bacterial colonies, (3) incubation of the membrane

filter and nutrient pad assembly (4) counting and evaluation of the types of bacterial colonies and (5) preservation of the membrane filter disk as a permanent record.<sup>4</sup> The assembly of the apparatus and the filtering of the water after the sample has been collected can be accomplished almost as quickly as it takes to tell about it.

### LABORATORY CONTROL OF MILITARY WATER SUPPLIES

The Armed Forces place great emphasis on bacteriologic examination of water consumed by personnel on military installations and under military jurisdiction. Laboratory examinations of water samples are essential to the maintenance of the quality of the water in accordance with established standards of potability. They provide a measuring stick for determining the quality of water drawn and the effectiveness of different treatment units. They also serve as a guide for adjusting water treatment processes.<sup>5</sup>

Another requirement for military water supplies at fixed installations requires that samples should reach the laboratory within 12 hours after collection whenever possible.<sup>6</sup> This is sometimes difficult of accomplishment and in field situations often impossible.

Military water samples are examined in accordance with accepted procedures,<sup>7</sup> and consist of the standard 3 dilution 5 tube most probable number (MPN) determinations of coliform density. To process water samples using MPN determinations requires a well equipped laboratory, highly trained technicians, and considerable time—at least 48 hours if only the presumptive test is run. It is quite evident that under field conditions the collection, icing (if possible), and shipping of water samples when laboratories are available is quite a chore. Results often are not received for a week or more and are too late to do much good especially if the water point has been moved to a new location.

The MPN method of bacteriologic water analysis has been in use for a considerable period of time while the membrane filter method for all practical purposes is comparatively new, having been introduced into the United States from Europe in 1947.

The adoption of membrane filters in Germany during World War II was brought on largely by the exigencies resulting from mass bombings and the shortage of trained laboratory personnel. With glassware shattered and incubators at a premium health departments of several cities such as Hamburg and Stuttgart found true economies of equipment and labor in the membrane filter procedure.<sup>8</sup> Since that time the technic has been evaluated by numerous investigators who have reported on membrane filter applications for many different purposes and under varied conditions. Private and state university laboratories the United

States Public Health Service, and the Army Environmental Health Laboratory have been instrumental in the continued development of membrane filter techniques.

Accuracy, reliability, cost, time of making analyses, and time involved in training technicians must be considered in evaluating the two methods. This is best done by describing the laboratory research and practical work accomplished by the various investigators studying the capabilities of the membrane filter.

#### COMPARISON OF THE MEMBRANE FILTER AND MPN METHODS IN EXAMINING SEA WATER

A comparison of the membrane filter and MPN techniques was made by Presnell Areisz and Kelly<sup>11</sup> in examining sea water. They performed carefully controlled experiments to determine the effect of bacterial densities on the agreement of results of the two methods, and the influence of turbidity on the agreement of results.

Water samples were collected from three stations selected on the basis of degree of pollution and turbidity. Stations were designated A, B, and C. Station A represented an approved shell fish producing area with an MPN per 100 ml of 70 or less, Station B represented a median area (restricted) with MPNs of 70 to 700 per 100 ml, and Station C represented a closed area with MPN exceeding 700 per 100 ml. Samples to be examined were taken twice daily and collected in accordance with standard procedures. Time elapsing between collection and beginning of examination of samples never exceeded two hours.

Included in table 1 are the comparable coliform densities obtained by membrane filter and MPN methods using the 95 per cent confidence limit of recorded MPNs as a base line.

TABLE 1 *A comparison of coliform densities in sea water as determined by membrane filter and MPN methods<sup>11</sup>*

Station	Average turbidity p p m.	Number of samples	Number of samples agreeing	Number of samples disagreeing	Per cent agreement
A	8	46	36	10	78.3
B	20	45	37	8	82.3
C	14	48	48	0	100.0
All stations	14	139	121	18	87.1

Summarizing the results of this experiment, it may be said that

- 1 The two techniques gave results 87 per cent in agreement
- 2 Results obtained from waters having high coliform counts gave better correlation than results obtained from low coliform density waters
- 3 Water turbidity greatly influenced the coliform recovery rate and should be considered in conjunction with bacterial density in determining the volume of sample to be filtered

4 Presnell and associates concluded their report by stating "The time and material saving features of the membrane filter method as compared with the MPN technique make it particularly desirable for examining the frequently large number of samples required for determining sanitary quality of water in shellfish producing areas."

### TIME AND COST FACTORS

Renn found that "the separate operations of preparing quantitative liquid media for MPN estimations of bacteria and the business of washing up glassware after each run was consuming roughly 40 per cent of the working time." In short he estimated that the bacteriologist on the project was reduced to a half time bacteriologist. With the adoption of the membrane filter method of bacteriologic analysis the limitation on the bacteriologist's production rate was set by the time spent in counting membranes. The time required for preparing samples and time for cleanup was reduced to insignificant levels. This resulted in a great saving of time and money.

The experience gained with the membrane filter in experimental studies led to its adoption at the Johns Hopkins University for class laboratory use. The student groups were made up largely of young civil engineers, none of whom were especially good laboratory technicians. The membrane filter was particularly well suited for use by these students as the techniques of working with it were easily learned and resulted in a saving of time.

An interesting secondary use of the membrane filter technique is the preparation of permanent records of critical experiments. Demonstrations of results can be made by placing the dried preserved membranes in transparent plastic folders mounted on Bristol board or other suitable material.

The preservation and mounting of membranes for permanent records of water samples is shown in figure 1. This is a reproduction of a preserved membrane, with sheer colonies easily apparent. Pertinent data regarding the water sample is recorded in the space below the membrane.

Form 11. Membrane Filter DiskField Water Sample Report  
Mount 1 Membrane here

Sample No. \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_  
 Location \_\_\_\_\_ Source \_\_\_\_\_  
 Organization (in. name) \_\_\_\_\_  
 Address \_\_\_\_\_  
 Contaminating factors \_\_\_\_\_  
 Type of water point \_\_\_\_\_  
 Collected by \_\_\_\_\_  
 Analyzed by \_\_\_\_\_  
 Volume of sample filtered in ml \_\_\_\_\_  
 Coliform count per 100 ml \_\_\_\_\_  
 Kind of medium used \_\_\_\_\_  
 Incubation time \_\_\_\_\_ Temperature \_\_\_\_\_  
 Remarks \_\_\_\_\_  
 Prepared by (Name and Initials) \_\_\_\_\_

*Figure 1 Example of permanent records using membrane filter disk as part of potable water report*

This type of record occupies little space, is inexpensive, graphic, and easily understandable. It will be of great benefit to military preventive medicine personnel and field water plant equipment operators. A record such as this should be especially valuable as a timesaver, eliminating the need for computing MPNs and writing out rather detailed (and often misunderstood) reports.

#### ADVANTAGES AND DISADVANTAGES OF THE MEMBRANE FILTER RELATIVE TO MPN METHODS

##### Advantages of the Membrane Filter Relative to MPN Methods

1. One of the principal advantages of the membrane filter is that with its adoption by the Armed Forces, a portable membrane filter bacteriologic laboratory is now available for water sample analysis at water points located in isolated areas, whereas so often in the past, no method of determining water quality has been available other than by chemical and physical methods.



2 Eliasson stated "Precision has been achieved far beyond that conceivable by any other method of coliform analysis" <sup>11</sup> "It is desirable to keep in mind the fact that, unless a large number of portions of sample are examined the precision of the fermentation tube test is rather low. For example, even when the sample contains 1 coliform organism per ml about 37 per cent of 1 ml tubes may be expected to yield negative results, because of irregular distribution of the bacteria in the sample. When 5 tubes with 1 ml sample in each are employed under these conditions a completely negative result may be expected less than 1 per cent of the time."

"Even when 5 fermentation tubes are employed however the precision of the result obtained is not of a high order. Consequently, great caution must be exercised when interpreting in terms of sanitary significance the coliform results obtained from the use of a few tubes with each dilution of sample."

3 Results are obtained in a relatively short period of time. "It has been variously estimated that between 40 and 50 per cent of the time used for running MPN determinations is used for the preparation of media and washing up. Less labor per sample is required for the membrane filter technique. Labor in today's laboratories is a major factor in cost" <sup>10</sup> The greater productivity of existing (laboratory) personnel makes the membrane filter technique even more attractive <sup>11</sup> <sup>12</sup>

4 The membrane filter lends itself to field use. The portable kits permit "on site" filtration and incubation of water samples within a few minutes. The samples if incubation is not available can be filtered and the membrane filter disk shipped to a laboratory on a preservative medium at ambient temperatures. Results of this method have proved satisfactory <sup>10</sup> <sup>11</sup> <sup>12</sup>

5 Greater reliability is achieved by securing actual bacterial numbers at the sampling site rather than after growth or die off during transit to the laboratory <sup>13</sup>

6 Another factor which gives the membrane filter an advantage is its versatility. It can be used for many other purposes other than for water sampling. Not the least of these is the fact that it can be used as an air sampling device <sup>14</sup> <sup>15</sup> This will be covered in subsequent discussions in more detail.

7 Space is of paramount importance whether it be under field or laboratory conditions. The membrane filter meets the requirements of space and weight satisfactorily, the field kit being no larger than an ordinary suitcase and weighing approximately 30 pounds complete.

8 Preservation of membrane filter disks as a graphic compact method of retaining permanent results of water sample analyses is a major advantage. The disks preserved and mounted on suit

able material tell a picture story. Individuals totally unfamiliar with bacteriology can inspect visually and quickly be made to understand the significance of colonies growing on a membrane filter whereas trying to explain the same results reported from MPN data is extremely difficult, not to say impossible.

9 Training military preventive medicine and laboratory technicians and specialists in membrane filter techniques will require less time and equipment than similar training involving MPN determinations.

#### Disadvantages of the Membrane Filter Relative to MPN Methods

1 The coliform density estimates obtained using the membrane filter technique are generally less than the MPN method. The difference in density estimates is partly but not wholly the result of the mathematical bias of MPN. There is also some question as to whether the same organisms are counted in the two tests. More study is needed.<sup>10</sup>

2 In waters containing unusually large amounts of algae, clogging of membranes may preclude testing large enough samples to provide a reliable indication of coliform density.

3 In highly turbid waters filter clogging may limit usefulness.

4 Variations in skill of individuals in recognizing and distinguishing the characteristic sheen colonies may cause variations in results.

5 Cost of membrane filter disks are greater in comparison than the costs of media required for "negative" fermentation tube tests. This is narrowed when a good many tests require confirmation or completion. The cost of membranes should go down as they come into more common use.<sup>10</sup>

#### OTHER USES OF THE MEMBRANE FILTER

Among the advantages listed for the membrane filter was one concerning versatility. Experimenters have worked on, and are presently engaged in research on applications of the membrane filter technique in air pollution studies, evaluating air cleaners, isolation and identification of microorganisms in food and dairy products, collection of radioactive and fluorescent particles for detection purposes, isolation and identification of biological pathogens, analysis of sewage and industrial wastes and many other areas.

*Microbiologic air pollution* Goetz<sup>16</sup> discussed a specific method for the collection of microbiologic air contaminants which employs an initial conversion of the airborne matter into a liquid suspension in the presence of protective colloids by an impingement process, followed by further concentration and subsequent nutrition on molecular filter membranes.

*Size determination of silica particles* Burke<sup>17</sup> discussed the sampling of silica dusts by means of the membrane filter. The dust was collected on a membrane filter, the filter dissolved by means of an organic solvent and dust particle size determined by turbidimetric methods. The method was adjudged reliable and rapid.

*Use of the membrane filter in the measurement of biological incorporation of radioactive isotopes* Atkinson and McAdden stated "The estimation of total isotope incorporation into metabolizing cells is often necessary. In such cases direct counting of radiation from the intact cells will generally be desirable. The main requirement for accuracy is removal of radioisotopes external to cells and uniform plating of a suitable thin layer of cells."<sup>18</sup>

The membrane filter was found suitable for the collection of samples for counting. The time required was less than other methods since the cells were retained quantitatively on rather than in the filter. Absorption of radiation by filter was found to be negligible.

*Dairy products* Rodriguez and Walter<sup>1</sup> described the use of the membrane filter in evaluating dairy products consisting of butter, ice cream mix and ice cream. Their findings indicate that under laboratory conditions the membrane filter portable field kit produced results comparable to those obtained employing standard methods. They justified its use for the microbiologic rating of butter, ice cream mix and ice cream.

*Isolation of organisms from spinal fluid* Wayne and Junrez<sup>20</sup> reported their success in using membrane filter technique for isolating *Coccidioides immitis* from the spinal fluid of two patients having coccidioidal meningitis. They had been totally unable to isolate the organism from either patient by standard techniques.

#### PROPOSED AIR FORCE TRAINING PROGRAM IN THE USE OF THE MEMBRANE FILTER

It is expected that the membrane filter since its adoption by the Air Force for field use will become in the not too distant future a standard item of equipment for use by preventive medicine personnel. Air Force laboratories, water and sewage plants and other Air Force owned or operated facilities requiring laboratory analyses.

Prior to any widespread use of the membrane filter by Air Force preventive medicine personnel, laboratory personnel, or water and sewage plant operators it will be necessary to initiate a training program in the use of the membrane filter. This can be readily accomplished by including hours for training in the curricula of existing courses for preventive medicine and laboratory

technicians currently being taught at the School of Aviation Medicine, Gunter Branch, Gunter Air Force Base, Ala

Training accomplished at the School of Aviation Medicine will serve a threefold purpose (1) provide a trained corps of military personnel familiar with membrane filter techniques who will be available in the event of emergencies, (2) stimulate interest in membrane filter methods, which may result in additional research into improving existing procedures and developing new applications, and (3) eventually cause a saving in dollars and cents by the reduction in time involved in making routine laboratory water analyses based on global deployment of the Air Force

Command Surgeons can accomplish training in the use of the membrane filter for personnel unable to attend a formal training course by delegating a responsible officer, preferably the Command Sanitary and Industrial Hygiene Engineer, to initiate a training program at base level. Base clinical laboratory officers and sanitary and industrial hygiene engineering officers can serve as instructors to enlisted personnel on an "on the job training basis." In the event these officers are not familiar with membrane filter techniques, arrangements can be made with the United States Public Health Service for them to receive training at the Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio.

There is a possibility also that the manufacturers of membrane filter field kits<sup>6-7</sup> would co-operate in a training program by demonstrating and giving a familiarization short course on membrane filter applications to certain key personnel, such as the instructors in preventive medicine and clinical laboratory courses at the School of Aviation Medicine, Gunter Branch.

#### SUMMARY AND CONCLUSIONS

The lack of adequate bacteriologic water quality control under field conditions has been discussed. In the past this control was dependent on chemical and physical disinfection because of a lack of practical, portable bacteriologic laboratory equipment for water analysis. The adoption by the Air Force of the membrane filter portable field kit in January 1957 has provided preventive medicine personnel with the equipment needed to make rapid, precise analysis of field water supplies. The membrane filter was compared and evaluated against the standard MPN method of bacteriologic water analysis with the following conclusions:

1. The adoption of the membrane filter by the Air Force for use in the field was a definite step toward improving water quality control at advanced bases, isolated installations, and at field water points.

2. The increased precision over existing methods of water analysis will make the membrane filter a very useful tool for

military medical laboratories at fixed installations where routine water quality control tests are performed. Its use would result in a great saving of time, equipment, and money.

3. The adaptability and versatility of the membrano filter would make it a useful diagnostic tool in clinical laboratories, industrial plants, and other Air Force facilities requiring laboratory control.

#### REFERENCES

1. *Military Water Supply and Purification*, Department of the Army Technical Manual 5-295 Aug. 1945.
2. *Flight Surgeon's Manual*, Department of the Air Force, Air Force Manual 160-5, Water Control 397.404 July 1954.
3. *Special List of Equipment for Sanitary and Industrial Hygiene Engineers*, Department of the Air Force, SLOE 56-24 Jan. 1957.
4. McKee, J. E., Derby, R. L., Goetz, A., Noble, P. E., and Stretch, L. Technique of bacteriological examination of water with molecular filter membranes. *J. Am. Water Works Assoc.* 45: 1196-1210 Nov. 1955.
5. *Sales Catalogue & Bulletin*, Millipore Filter Corporation, Woburn, Mass. 1956.
6. *Portable Laboratory for Bacteriological Analysis of Water Model SBS-1*, Salem-Bristle Inc., Hyala Process Division, Arch St., Cambridge, P. 1956.
7. *Isopor Water Laboratory Bulletin*, A. G. Chemical Co., Box 65C, Pasadena, Calif. 1956.
8. *Sanitary Control of Water Supplies for Fixed Installations*, Department of the Air Force, Air Force Manual 160-4 Jan. 1949.
9. *Standard Methods for the Examination of Water, Sewage, and Industrial Wastes*, 10th edition, American Public Health Association, Inc., New York, N. Y. 1955, pp. 374-386.
10. Rawn, A. M., and Bowers, P. R. Membran filter advantage and disadvantages. *Water and Sewage Works* 103: 36-37 Jan. 1956.
11. Pressell, M. W., Artasz, W., and Kelly, C. B. Comparison of MF and MPN technique in assessing water. *Pub. Health Rep.* 69: 300-304 Mar. 1954.
12. Rahn, C. E. Membrane filter technique as used in bacteriological examination of water. Unpublished report, 18 Oct. 1956.
13. Elias, R. Membrane filters for water quality control. *Water and Sewage Works* 102: 523-524 Dec. 1955.
14. Geldreich, E. E., Kahler, P. W., Jeter, H. L., and Clark, H. F. Delivered bacteriologically pure water by means of a membrane filter for chlorine bactericidal water. *Am. J. Pub. Health* 45: 1462-1474 Nov. 1955.
15. Whitby, K. T., Alger, A. D., and Jordan, R. C. Dust spot method for evaluating air cleanliness. *Heating, Piping & Air Conditioning* 28: 151-157 Nov. 1956.
16. Basic problems of microbiological air pollution. *Am. Indus. Hyg. Assoc.* 16: 113-1.
17. Jr. Six silica particles collected on membrane filter. *Hyg. A. Quart.* 1953.
18. A. and McF. Use of membrane filters for the detection of bacteria. *J. Bact.* 71: 123-124 Apr. 1957.
19. and "membrane filter for Coccidioides immitis. *Clin. Path.* 25.
20. Juarez, R.
21. fluid by 1955.

## Uncomplicated Pregnancy Following Bilateral Lung Lobectomies

ZACHARY T. TRAVICK *Captain USAF (MC)*

ARTHUR LEBER *Captain USAF (MC)*

ARCHIBALD G. M. MARTIN III *Lieutenant Colonel USAF (MC)*

**T**HE OCCURRENCE of pregnancy following pneumonectomy is unusual inasmuch as diseases requiring pulmonary surgery are infrequent in women of childbearing age. Formerly the two most common indications for resection were bronchiectasis and certain lung abscesses. However, with the increasing list of indications for, and the decreasing mortality and morbidity following extensive pulmonary surgery, it is likely that in the future more women with pulmonary resections will become pregnant. Although this combination will present a serious problem, the outcome is not necessarily unfavorable.

### CASE REPORT

A 19-year old woman had a history of cough productive of large amounts of sputum since the age of six months at which time she was said to have had pneumonia. The cough was characteristically worse in the morning and was productive of large amounts of yellow phlegm. At times there was hemoptysis associated with episodes of chills and fever. The cough was so severe that it was necessary to raise the head of the bed at night for ease of respiration. Past history also revealed maxillary and frontal sinusitis with head colds and a drainage from the right ear. The patient had had jaundice at the age of seven years and had been hospitalized for five weeks with apparent complete recovery.

In February 1953, the patient was seen at a university hospital because of the chronic productive cough. Examination revealed scarring of the right tympanic membrane and tenderness over the right mastoid area. The tonsils were hypertrophied to grade III and were slightly injected. There was a mucopurulent postnasal discharge. Cervical adenopathy was noted bilaterally. Examination of the lungs revealed bronchial type breathing with vocal fremitus increased in, ses  
posteriorly and laterally and some generalized rales 1  
There was some clubbing of the fingers and toes. Bronch d  
bilateral lower lobe bronchiectasis. Sinus films were a 1

capacity revealed 39 33 and 39 per cent on three occasions with a total pulmonary capacity varying from 1 000 to 1 200 ml of inspired air

In March a right middle and lower lobectomy was performed Post operatively the patient did well and the hospital course was uneventful and uncomplicated Following discharge the sputum decreased in amount to less than a half cup per day There was a moderate gain in weight and no more episodes of hemoptysis The dyspnea was decreased in severity The patient returned to the university hospital in November for re evaluation At this time vital capacity was approximately 47 per cent A bronchogram showed involvement with bronchiectasis of the left lower lobe and lingular segment of the upper lobe

In November the left lower lobe and the lingular segment of the left upper lobe were resected Again the patient ran an uneventful postoperative course and two weeks postoperatively the vital capacity was found to be 1 liter or 33 per cent of normal Following the second discharge from the hospital the patient again did fairly well for many months but in the latter part of 1954 she again developed an increased amount of cough and recurrent episodes of hemoptysis and pleuritic chest pain The cough became productive of increased amounts of yellow sputum and the patient had recurrent bouts of pulmonary infection with fever and leukocytosis

The patient was first seen in the clinic of this hospital in October 1955 at which time she was found to be in about the second month of gestation This was her first pregnancy Her last menstrual period began 16 August and was of two days duration The previous menstrual period began 1 July and was of five days duration Examination revealed numerous rhonchi and coarse bubbling rales in both lung fields, slightly hyperresonant to percussion There were no areas of dullness Clubbing of the fingers was present Pelvic examination revealed a uterus enlarged to the size of a 2½-month pregnancy Fetal heart tones were not heard A roentgenogram showed the trachea to be slightly deviated to the left Both diaphragms were elevated and the costophrenic angles were blunted bilaterally A mild compensatory scoliosis to the right was present giving the cardiac shadow the appearance of lying mostly in the left lung field The left diaphragm was more elevated than usual and the supradiaphragmatic area was considerably hazy because of old pleural adhesions No active underlying lung disease could be detected An electrocardiogram was within normal limits Hemogram and urinalysis were within normal limits The serologic test for syphilis was negative The sputum was negative for acid fast bacilli The patient's blood was Type A and Rh negative A vital capacity at that time was 2 4 liters

Because of the apparent increase in vital capacity and inasmuch as the patient had no dyspnea and her health did not seem to be affected adversely the pregnancy was allowed to continue The patient was

seen at frequent intervals in the medical and the prenatal clinic thereafter. She frequently complained of chest pain, cough tightness in the chest, difficulty in bringing up secretions, and recurrent low grade infections with slight fever. However, there were no complaints of increased dyspnea. Treatment consisted of expectorants, prophylactic antibiotics, and an injection of influenza polyvalent vaccine. Roentgenograms of the chest taken at frequent intervals showed no appreciable change in the appearance of the lung fields. Three electrocardiograms showed no evidence of myocardial disease or of ischemia. No Rh antibodies were present on frequent tests throughout the pregnancy.

At about the seventh month of gestation the patient went into premature labor and spontaneously delivered a 4 pound 14 ounce living infant under local 1 per cent Novocain (brand of procaine hydrochloride) pudendal block. There was no dyspnea, cyanosis, chest pain, or other unusual symptoms. There was a moderate postpartum hemorrhage, and a transfusion of 500 ml of whole blood was required.

The immediate postpartum period was uneventful, but on the seventh postpartum day the patient developed a sudden, very severe pain of a stabbing quality in the left lower portion of her chest. She also developed dyspnea and faintness and when first seen was quite pale and complained of numbness of her arms and feet. Vital signs were not impaired. She was treated with oxygen and narcotics, and after several hours the pain disappeared. The following day a similar episode occurred and again was relieved by narcotics. Blood cell counts following this episode were always within normal limits. Daily roentgenograms revealed no evidence of pulmonary infarction or of other changes. Electrocardiograms showed no change from the previous tracings. There was no hemoptysis, fever, or leukocytosis. After the second episode the patient had no more difficulty and was discharged on the seventeenth postpartum day in good condition. The mother and infant were discharged in good condition.

The patient was seen several times during the following six months and her condition from an obstetric standpoint was normal. She continued to have recurrent bouts of pulmonary infections, however, and required frequent courses of antibiotics. Her dyspnea, weight, and general condition remained about the same as prior to pregnancy. Vital capacities were 1,500 and 1,200 ml on two occasions.

At this time bronchography, utilizing one of the rapidly eliminated opaque media, was contemplated; however, before the opaque media desired could be procured, the patient moved elsewhere.

### DISCUSSION

This case presented an interesting problem in the differential diagnosis of postpartum chest pain. First, the various forms of chest wall pain must be considered, although as a group they are not particularly increased in incidence or aggravated by



delivery or pregnancy. Intercostal neuritis is usually fairly easy to recognize and the segmental distribution of herpes zoster is characteristic. Spinal cord lesions and mechanical nerve root compression are related more specifically to coughing, sneezing and straining and other activities which increase the cerebral spinal fluid pressure. The pain of intercostal neuritis is usually lancinating with electric shock sensations and can be aggravated by stimulation of the nerve proximal to the point of pain. Muscular pain in the chest wall such as that in acute torticollis is familiar and easy to recognize. However, it is not so well known that myositis may also involve the rhomboid group of muscles and the shoulder girdle muscles at their thoracic attachments. Costochondral pain is probably much more frequent than is generally realized. This syndrome, first described by Tietze, consists of clearly localized pain in one or more of the cartilages with tenderness to pressure and usually with a palpable enlargement of the cartilaginous bridge adjacent to the lower rib. The pain is usually of a dull character with little relationship to respiration or movement and it may be quite severe. Injury to the chest wall sustained after delivery while the patient is unconscious or under the influence of narcotics and analgesics probably occurs more than we are willing to admit. Special precautions must be taken to prevent the patient from being rolled onto the grip handles of the delivery table. Finally "rheumatic" pains including fibrositis and spondylitis must be considered, although they are of infrequent occurrence in the thoracic region.

Cardiovascular pains usually occur in the older age group although they are not by any means unheard of in the childbearing age. Most frequent of these perhaps is myocardial infarction. The characteristic substernal pain with radiation into the left shoulder is easy to recognize. The diagnosis is confirmed by the increased white blood cell count, sedimentation rate and the characteristic electrocardiographic picture. Pericarditis occurs very frequently in the younger age group and may be difficult to distinguish from other types of cardiovascular diseases. The presence of a friction rub together with a characteristic electrocardiographic pattern however is usually present. Aortic pain is becoming increasingly infrequent and usually occurs only in older age groups. The diagnosis of this disease may be very difficult unless the possibility is kept in mind. The pain is described as a deep boring agonizing type pain comparable to a severe toothache. It is either retrosternal or may be posteriorly located when an aneurysm exerts pressure on the thoracic spine. Other symptoms arising from pressure and encroachment of the aneurysm also may be present.

Abdominal diseases are well known to cause referred pain in the chest. Probably the most frequent of these, and one which might occur in the childbearing age, is the splenic flexure syn-

drone. This diagnosis unfortunately must be made only after other organic causes of similar pain have been eliminated by thorough studies. Gallbladder disease may cause referred pain in the right shoulder and, occasionally, in the left shoulder and other areas of the chest. Other characteristic signs and symptoms of gallbladder disease, however, are usually present. Subdiaphragmatic conditions, with hemorrhage or infection in the reproductive organs, may be associated with pregnancy and delivery.

Mediastinal diseases and those not involving the parietal pleura and pericardium may exert referred pain to the chest wall and may indicate serious intrathoracic disease. The pain is described as a vague, indefinite sense of distress in the region of the pathologic process, and diagnosis may be very difficult.

The most common causes of chest pain in the childbearing age, and which would be associated with pregnancy and delivery, are those diseases causing irritation of the parietal pleura. The most common of these, of course, is pneumonia. This diagnosis immediately comes to the mind of all who see patients with thoracic pain and the characteristic rales, friction rub, cough, expectoration, and elevated white blood cell count, and roentgenographic findings usually make the diagnosis simple. Pneumonia occurs more frequently following delivery because of decreased defensive mechanisms against disease and because of aspiration of secretions associated with anesthesia. Pulmonary embolism is not uncommonly associated with delivery. This disease produces a characteristic pleurisy associated usually with hemoptysis, and if the embolus is of sufficient size, with a characteristic plaque like appearance on roentgenographic examination within a day or two. There is also a leukocytosis and elevated sedimentation rate. Activation of a pulmonary tuberculous process is increased during pregnancy and may manifest itself only after delivery. The roentgenographic appearance usually explains the cause of the pain immediately. Malignant diseases may be increased during pregnancy because of the influence of the great alteration in sex hormones.

Lastly, there must be considered the pleural pain caused by pulling of adhesions on the parietal pleura associated with the sudden decrease in intra abdominal mass and the sudden lowering of the diaphragm. This process is not discussed to any extent in the literature, but it apparently is not infrequent in patients who have had previous pulmonary disease and have developed pleural adhesions. It is largely a diagnosis of exclusion and should be made only after the previously discussed causes of pleural pain have been eliminated. There is no roentgenographic change, leukocytosis, or increase in sedimentation rate. I believe that our patient experienced this type of pain.

## COMMENTS

No other case of pregnancy with such extensive pulmonary resection is found in the literature. As has been pointed out before, the degree of function following resection depends not so much on the amount of lung left as upon the age of the patient and the excellence of function of the chest wall and of the diaphragm.<sup>1</sup> It is well known that the load of pregnancy causes an increased oxygen requirement, increased blood volume, and increased work of the heart. Long and associates,<sup>2</sup> however, reported a case of pregnancy following a right pneumonectomy for adenocarcinoma in which there was no significant change in the ventilatory portion of the respiratory function. Wright,<sup>3</sup> Pitheu,<sup>4</sup> and Kellerman and Smith<sup>5</sup> reported other cases in which there was no subjective increase in dyspnea during gestation. Thus, in none of the five above mentioned cases was there any evidence that pulmonary capacity is impaired by pregnancy, and indeed, in three of the cases there was a slight subjective improvement. Thomson and Cohen<sup>6</sup> suggested that vital capacity increases slightly as pregnancy advances and the subcostal angle widens, but there is probably an additional mechanism in effect following resection. There is always a degree of compensatory emphysema following removal of lung tissues and the enlarging uterus probably aids pulmonary function in the same manner as does an emphysema belt or a pneumoperitoneum. With this reasoning the danger period would be in the immediate postpartum period and such was the case in two of the deliveries. Our patient experienced pleural pain on the seventh and eighth postpartum days, probably due to tension on visceroparietal adhesions.

While therapeutic abortion can be justified in a woman following pulmonary resection, the evidence, though small, indicates that this is not always the wisest course. Many patients will desire to proceed to term and if kept under careful observation they may be allowed to do so in selected cases where no other complications are expected.

## SUMMARY

A case is presented of a patient with a right middle and lower and a left lower lobectomy and lingulectomy who had a normal uncomplicated pregnancy and a spontaneous but premature delivery. It is suggested that many selected postpneumonectomy cases may safely be allowed to proceed to term.

## REFERENCES

1. I. I. I. G. Surg. cal. tr. in pt. of bilat. tal. bronch. ct. sis. *J. Thoracic Surg.* 19: 25-265 F. b. 1950.
2. Long, J. H., Wester, M. R., Will, J. R., and R. mond, G. P., Cardiovascular and respiratory studies in pregnancy following pneumonectomy. *J. A. M. A.* 143: 358-360 May 27, 1950.

- 3 Wright J L Parturition after pneumonectomy *Brit M J* 2 1414 1415 Dec 1949
  - 4 Pilheu J A Neumonectomia izquierda Seguida de embarazo y parto normales *Prensa med. argent* 39 2459-2461 Oct 10 1952
  - 5 Kellerman F and Smith R S Parturition after pneumonectomy *Brit M J* 2 758 Oct 1949
  - 6 Thomson, A J and Cohen M F Studies on circulation in pregnancy vital capacity observations in normal pregnant women *Surg Gynec & Obst* 66 591 603 Mar 1938
- 

### COBALT 60 TELETHERAPY IN CANCER

"Cobalt 60 teletherapy is essentially a form of super voltage radiation. There is no specificity of action on the various modalities of supervoltage and it is a misconception to suppose that Co<sup>60</sup> teletherapy has something to offer when 2 million volt x ray therapy has not. Both offer the possibility of increasing the dosage of radiation to tumors because of better skin tolerance and a slight increase in tolerance of the deeper structures. But both must be used with due regard to the possible later appearance of subcutaneous and deep muscle fibrosis and other signs of cumulative damage and the curability of a tumor is one of its fundamental biological properties. *Supervoltage or Co<sup>60</sup> teletherapy is not indicated in a number of conditions, e g lymphomas in areas of superficial lymph nodes. Its use is elective in a number of other conditions e g, mediastinal and retroperitoneal lymphomas. Its use is imperative in a considerable number of conditions including cancers of the oropharynx and urinary bladder and late cancers of the cervix and vagina. It has technical advantages that need to be explored further but an objective and unemotional approach is necessary.*"

—GILBERT H FLETCHER M D

in *Journal of the American Medical Association*  
p 244, May 18 1957

# Generalized Skin Eruption Caused by Bromsulphalein

DAVID L. DEUTSCH *Lieutenant Colonel, MC USA*

OTTO W. NEUBUERGER *Captain, MC USAR*

OSWALD R. JENSEN *Colonel MC USA*

THE Bromsulphalein (brand of sulfobromophthalein sodium) excretion test has become one of the most acceptable and valid of those used for determination of liver function. When one compares the number of times the test has been used and the relative paucity of published reports on its adverse effects it becomes apparent that it is a relatively very safe procedure. More important of course, are the occasions of adverse reactions observed by physicians which are never written up for publication or dissemination. In our own experience, and from communications with others it would appear that except for an occasional local irritation from extravasation of the drug the incidence of any generalized manifestation from Bromsulphalein has been nonexistent or very rare.

An acute allergic reaction in a patient with a history of bronchial asthma and who exhibited severe sensitivity reactions to many substances was reported by Chambers and Moister.<sup>1</sup> The reaction was evidenced by severe dyspnea, cyanosis, unconsciousness and clonic convulsions. De Andino and McKeown<sup>2</sup> observed a case characterized by dyspnea, cyanosis, apprehension and hypotension which appeared within three minutes after injection of the drug. Anaphylactoid reactions also were noted by DiCaprio and Troen,<sup>3</sup> Roth and Morey, Gabuzda and Scudamore and McVay. Morey and associates reported two cases of mild local inflammatory reaction.

We have found no previous reports of generalized severe coalescing morbilliform rash resulting from the intravenous injection of Bromsulphalein as manifested in the following case report.

## CASE REPORT

A 44-year-old soldier was undergoing study for jaundice of four days duration associated with vague diffuse abdominal pain and anorexia. Physical examination findings were not remarkable except

---

From Ireland Army Hospital, Fort A. 17

for obvious jaundice and a slightly palpable nontender liver. Liver function tests showed a total bilirubin of 5.8 mg per 100 ml, with direct bilirubin of 3.1 mg and an indirect 2.7 mg per 100 ml. Thymol turbidity was 2.6 units. Serum alkaline phosphatase was 16 Shinowara-Reinhardt, Jones units. At this time a Bromsulphalein excretion test was performed using a total of 370 mg of dye (5 mg per kilogram of body weight) injected intravenously. Within about 1 hour the patient developed a nonpruritic, finely macular, generalized rash of the entire body except the palms and soles (fig. 1). Over the next several hours

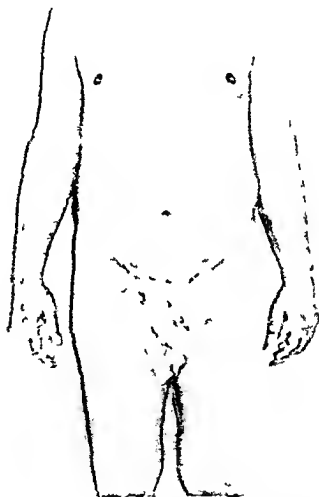


Figure 1 The macular coalescing rash involved the entire body except palms and soles

the rash became more intense, began to coalesce and continued to do so for several days. Also noted was a temperature of 103°F which subsided in 1 day while the rash increased in intensity and after several days also subsided. Complete clearance of the rash took about 5 to 6 days. There were no clinical manifestations of other diseases in which a morbilliform rash is seen. Blood cultures, roentgenogram of the chest and heterophile antibodies were all negative. The jaundice subsided in 2 weeks. The initial Bromsulphalein re

tention was 67 per cent at 45 minutes. No further injection was given but a skin test utilizing 1 ml of 1:10,000 Bromsulphalein and patch test using 1:20 concentration were both negative. A punch biopsy from the right leg showed aggregates of chronic inflammatory cells in the upper dermis interpreted as dermatitis consistent with dermatitis medicamentosa. Gallbladder series showed cholelithiasis for which the patient underwent cholecystectomy uneventfully at a later date. He gave no history of any previous allergic manifestations and had never been exposed to Bromsulphalein previously.

### SUMMARY

A case of generalized severe coalescing morbilliform rash caused by intravenous injection of Bromsulphalein is reported.

### REFERENCES

- 1 Chambers F N and Moister F C Bromsulphalein reaction. *Am J Med* 5: 309-310 Aug 1948.
- 2 d Andino A M Jr and McKeown J J Jr Unusual toxic reaction to Bromsulph 1 in *Ann Int Med* 34: 1265-1269 May 1951.
- 3 DiCappi J M and Troen P Acute fatal reaction to sulfobromophthalein. *U S Armed Forces M J* 4: 935-936 Jun 1953.
- 4 Roth J L A Anaphylactoid reaction to sulfobromophthalein sodium. *J A M A* 143: 607-608 July 1 1950.
- 5 Morey G G, Gruzda G J and Scudamer H H Sensitization to bromsulphalein (phosphotetrasulfobromophthalein-disodium sulfonate). *Gastroenterology* 13: 246-249 Sept 1949.
- 6 McKay L V Jr Acute fatal reaction to sulfobromophthalein (bromsulphalein) liver test. *J A M A* 152: 1622-1623 Aug 22, 1953.

# Hindquarter Amputation for Hip Chondrosarcoma

EARL W. BRANNON *Lieutenant Colonel USAF (MC)*  
JOHN I. TRACY *Major USAF (MC)*

**T**HE PURPOSE of this article is to describe an interesting case of chondrosarcoma of the hip apparently arising from a pre-existing synovial chondromatosis and to evaluate some of the more practical points concerned in the management of such a patient on whom a hindquarter amputation is to be performed.

Billroth attempted the first hindquarter or interinnominate-bdominal amputation 67 years ago, however, the patient died shortly after the operation, probably from shock. In 1895 Girard achieved the first successful hindquarter amputation, which consists of removing the entire lower extremity with the adjacent innominate bone. The principles of the surgical procedure were laid down by the English surgeon, Hognrth Pringle,<sup>1,2</sup> in 1909 when he reported three cases.

There are over 185 recorded cases to date, most of which have been performed for sarcoma. Prior to 1934 the operative mortality for this procedure was about 60 per cent. Since then the mortality has been less than 20 per cent, and the improvement may be attributable to the use of transfusions and better supportive measures. American surgeons did not gain interest in the operation until after 1940. In 1942 Loughton<sup>3</sup> reviewed the literature and reported three of his own cases. He pointed out that shock and prolonged suppuration were the chief causes of early death. Morton<sup>4</sup> reported four cases in which the amputation was done primarily as a palliative measure. He stressed the necessity for careful hemostasis and the avoidance of surgical shock. In England, Gordon-Taylor and co-workers<sup>5,6</sup> had the most outstanding experience in this field with over 21 personal cases in which their operative recovery was a commendable 71 per cent. The final prognosis was most favorable in the infiltrating chondroma or chondrosarcoma, some of their patients being free from recurrence nearly 10 years after amputation. Interestingly,



most of their amputations were performed under spinal anesthesia and with the patient in a true lateral position. Gordon Taylor and co-workers emphasized the need of a retention catheter during and after the operation and the importance of having adequate blood supplies at hand. In 1946 Pack and Ehrlich<sup>7</sup> reported six cases of amputation for malignant tumors. They believed that the radical procedure served a distinctly useful role in the treatment of selected patients.

Beck and Bickel reported 12 cases in their series from the Mayo Clinic. When the hip is primarily involved pain may be severe and the tumor may be small and hard to demonstrate as it was in our case. All of their cases had a temporary respite from pain. In 1949 Ariel and Hark<sup>8</sup> reported eight cases and emphasis was placed on utilizing this procedure with dispatch when indicated. During the same year, Wise<sup>9</sup> reported his experiences with hindquarter amputation in five patients with primary malignant tumor of the innominate bone or upper part of the thigh. There was no operative mortality in his series. Saint<sup>10</sup> reported a case of osteosarcoma of the innominate bone treated by amputation about four months after the appearance of the tumor. The patient subsequently died a short time thereafter. Saint emphasized the necessity of early diagnosis of malignant disease if adequate removal of the tumor is to be successful and his article contains an excellent discussion of the operative management. Coley, Higinbotham and Romieu<sup>11</sup> reported a series of 14 cases, 3 of which were osteogenic sarcoma and 11 chondrosarcoma. They believed that the rather long term palliation made the procedure definitely worthwhile. Necrosis of the skin flap and persistent sinus with residual abscess were the most frequent complications encountered. Coley and his associates believed that chondrosarcomata of the hip and pelvic bone were secondary sarcomatous evolutions of benign chondromas.

Despite early failures, the procedure has gained more recognition in recent years with a present mortality rate of approximately 15 per cent. Modern anesthesia, blood restitution and antibiotics have greatly extended the field of this extensive type surgery. The indications for such a radical operation will always be limited. Most of the procedures have been done for malignant tumors affecting the proximal portion of the thigh, hip or innominate bone so that removal by hip joint disarticulation was impossible. The prognosis will depend on the anatomic type and extent of the tumor, the number of recurrences prior to surgical intervention and the presence of distant metastases. The procedure should not be withheld from any patient whose only chance of survival lies in its performance.

## CASE REPORT

A 34 year old Air Force pilot was admitted to this hospital 24 October 1955 complaining of pain and stiffness in the right hip. In December 1954, he spontaneously developed pain in the hip region. There was no antecedent history of injury. Pain persisted for three weeks after which he reported to his local base hospital where a diagnosis of arthritis of the hip was made and an extensive course of physical therapy, including diathermy, given. The pain became more intense with further limitation of motion and the patient was transferred to another hospital. Roentgenograms of the hip at this time revealed no evidence of bone or joint disease. On 31 March 1955, arthrotomy of the joint was performed with partial excision of the synovium and anterior capsule. Clinical impression substantiated by the pathologist's reports was synovial chondromatosis. The wound healed uneventfully and after a course of physical therapy, the officer was discharged to duty 21 April. Upon return to flying status, he served a period of temporary duty in North Africa and again developed pain and stiffness in the involved hip to the extent that he could no longer fly.

Evaluation at his local base hospital 15 October revealed virtual ankylosis of the hip with severe pain upon weight bearing, and roentgenograms showed periparticular amorphous calcification about the hip joint (fig. 1). In the 10-month period following initial onset of symptoms the patient had lost 15 to 20 pounds even though his appetite remained good. He was referred to this hospital for hip fusion. Past history was noncontributory with no episode of specific trauma nor infectious disease process relative to the hip.

Physical examination revealed a well developed and well nourished male in no acute distress except when attempting to bear weight on the right hip. He could not walk unsupported without intense pain in the hip joint. The head, neck, upper extremities, chest, and abdomen showed no significant findings. He stood with the pelvis tilted forward on the right and a compensatory lordosis and scoliosis of the lumbar region. A 20° flexion contracture was present in the right hip with no demonstrable flexion, extension, abduction, adduction or rotation movements. Spasm of the adductor musculature was present with 1-inch atrophy of the thigh and 1½ inch atrophy of the calf. A well healed, nontender 8 inch surgical scar was present over the anterior aspect of the right hip with a 2 cm nontender mass palpable beneath the upper aspect of the old scar. Neurologic examination was negative, and circulation in the right lower extremity normal.

Admission laboratory work revealed a normal blood count and urinalysis. The sedimentation rate was elevated to 35 mm. The blood alkaline phosphatase was reported as 7.4 iu/l and Armstrong units. A roentgenogram of the chest was negative. A roentgenogram of the right hip revealed a large amount of granular calcareous debris within

and about the joint and demineralization of the head and neck of the femur (fig. 1) Review of roentgenograms taken March 1955 showed no significant findings relative to the involved hip



*Figure 1 Roentigenogram October 1955 showing granular calcareous material within and about right hip joint with demineralization of head and neck of femur*

Initial clinical impression was a recurrence of the pre-existing synovial chondromatosis. The patient was placed at bed rest in traction for relief of pain. In view of the virtual ankylosis of the hip and severe pain upon attempted motion and weight bearing, it was believed that another arthrotomy and joint cleansing procedure should be performed.

On 14 November 1955 a posterior approach to the hip was made with excision of diseased synovium and adjacent tissues with a large amount of soft friable and calcareous material. The head and neck of the femur and the acetabulum did not appear to be involved. The mass present in the upper part of the old incision was also excised. The patient was kept in bed with balanced suspension while the wound healed.

The local pathologist's report was chondrosarcoma, both of the tissues removed from the hip joint and the mass from the old incision. The sections revealed neoplastic cartilage with marked pleomorphism of the nuclei, pyknotic nuclei and marked variation in size of the

nuclei (fig. 2). The nests of cartilaginous tissue were separated by dense fibrous connective tissue. The impression of chondrosarcoma was later confirmed by the Armed Forces Institute of Pathology, Washington D. C. In view of these findings, the case was presented to the hospital tumor board which concurred with the recommendation that a hindquarter amputation be performed as the only possible treatment for the relief and/or eradication of this disease.

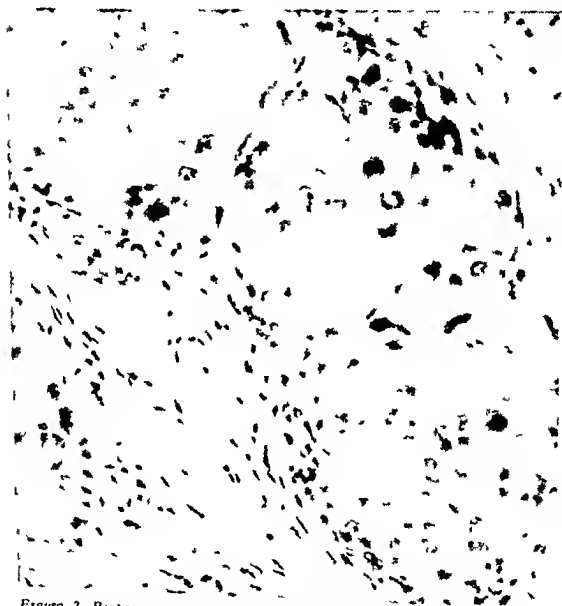


Figure 2 Biopsy specimen showing characteristics of chondrosarcoma. Note the binucleate cartilage cells and large hyperchromatic nuclei ( $\times 264$ ).

The patient finally submitted to surgical intervention 29 December when the entire right lower extremity with the adjacent innominate bone was removed through the sacroiliac and pubic joints. The procedure was performed under general hypotensive anesthesia with the patient in the lateral position and the operating time was 100 minutes. The anterior and posterior portions of the dissection were carried out simultaneously

with two tubes and the operative technique described by King and Seelquist<sup>11</sup> was essentially followed. Two tissue drains were laid in the extraperitoneal space and brought out at each end of the wound after closure of the posterior flap (fig. 3). A Foley catheter was in place during the operation and connected to a tidal drainage system after return to the recovery ward. The patient tolerated the extensive procedure without event, having been surprised with a transfusion of



Figure 3. Postoperative photograph showing placement of a flap and tissue drains.

2,500 ml of blood. At the time of surgery he required an extension about the incision and through the operative incision and he felt that there were distinct ripples in the old posterior and anterior scars (figs. 4 and 5).

The recuperative course was smooth except for the usual postoperative pain in the sternal area. Tetracycline sodium was used to control bowel movements during the first 24-hour period after which oral administration was resumed. The drains were removed 48 hours postoperatively and there were even until wound healing was assured. Except for a small superficial operative area in the superior part of the flap the wound healed well. This area was later connected by anastomosing an abdominal flap. Two weeks after the operation, the patient was up and about on crutches and undergoing rehabilitation in physical therapy (figs. 6 and 7). His appetite was good and he had no interference with bladder or bowel function. He had considerable relief of the previous pain.



Figure 4 Neoplastic cartilaginous cells with interspersed fibrous tissue (x 60)

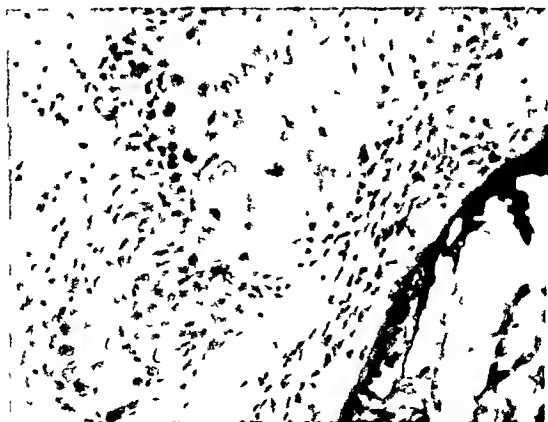


Figure 5 Nest of malignant cells exhibiting pleomorphism. The cartilaginous tissue shows marked pleomorphism (x 100)

The patient went home on convalescent leave and did well until 3 April 1956 when a roentgenogram of the chest first revealed evidence of pulmonary metastases. During the next two months he developed progressively intense pain in the pelvis, right sided headaches and some discomfort in the chest upon deep inspiration. He developed haziness of vision in his right eye and palpable nodules in the right portion of his scalp. Roentgenograms in July revealed destruction of the sacrum and both lung fields were heavily infiltrated with snowball metastases. He ran a rapidly downhill course with progression of symptoms relative to the pelvis, chest, right eye and scalp during



Figures 6 and 7 The healed posterior flap two months after amputation

which period the intense pain was controlled with spinal injections of absolute alcohol, heavy opiates and inhalation of Trilene (brand of trichloroethylene). The patient lapsed into a semicomatose condition and died during sleep 26 August, some 20 months after initial onset of symptoms.

The final clinical diagnosis was chondrosarcoma of the right hip, probably secondary to synovial chondromatosis.

Autopsy was performed 26 August and the gross anatomical findings were: (1) chondrosarcoma of right hip with extensive metastases; (2) pulmonary chondrosarcomatosis with metastatic chondrosarcoma of ribs; (3) epidural metastatic chondrosarcoma, spinal and cranial; and (4) metastatic chondrosarcoma to the tissues between the scalp and skull.

#### DISCUSSION

Unfortunately, there was a time lapse of some 12 months between the onset of symptoms and hindquarter amputation in this

case. Although the initial diagnosis was a carcinoma of the colon, there may be a question of extent of the disease. At the same time, certainly it is essential to know the extent of the disease before it can be carried out as a curative procedure. For survival if the lesion is beyond the bounds of resection and if it is not resectable, roentgenographically of course.

It is well known that the physical and psychological treatment have been attempted to relieve by various means. It is not feasible to perform this in the long run alone. Case reports from the literature have been reported with a variety of prostheses may be found in the literature. Our patient was not able to undergo amputation with a healthy colon. It is a lead a virtually normal and a good evidence of a good pre-operative condition after operation.

The technique of operation is described and the following points are mentioned. Psychologic preparation of the patient for extensive procedure is essential. Before operation the bowel is prepared with pre-operative cleansing enema and a tube is inserted. A Foley catheter is connected to a urinary bag. The procedure is carried out under general anesthesia. A transfusion is started before the operation to minimize the risk of shock. The patient is placed in the lateral position and supported. A little rotation is required to perform the dissection. Anesthesia with induced hypotension was found to be a factor in our case and the length of operation was considerably with two surgeons performing the anterior and posterior dissections simultaneously. However, it should be mentioned that with good supportive treatment and good anesthesia there is no great necessity for a hastily performed procedure and the possibility of rough handling of tissues and subsequent wound complications.

A large posterior flap was fashioned without the retention of the gluteus maximus muscle, since it was thought that this muscle was possibly involved by disease. The flap healed well and there was no problem of herniation of the unsupported abdominal



viscera Tissue drains left at either end of the incision were removed in 48 hours and postoperative Wagonston suction was instituted to relieve bowel distention Oral feeding and ambulation of the patient was encouraged as soon as possible Systemic antibiotics were continued until wound healing was assured

### SUMMARY

A case of chondrosarcoma of the hip with hindquarter amputation is presented, together with a survey of the literature The important points in the operative technic and the management of the patient are discussed Even though this extensive operation is performed in the hope of a cure, we believe that it is justifiable as a palliative measure alone

---

**ACKNOWLEDGMENT** We are grateful to Doctor William A Quijano Lackland Air Force Hospital for the photographic illustrations

### REFERENCES

- 1 Pringle J H Some notes on interpelvis abdominal amputation with report of 3 cases *Lancet* 1 330-333 Feb 20 1909
- 2 Pringle J H Interpelvis abdominal amputation with one on 2 case *Brit J Surg* 4 283-296 Oct 1916
- 3 Leighton W E Interpelvisabdominal amputation report of 3 cases *Arch Surg* 45 913-925 Dec 1942
- 4 Morton J J Intertrunculo-abdominal (hindquarter) amputation *Ann Surg* 115 628-646 Apr 1942
- 5 Gordon Taylor G and Wiles P Intertrunculo-abdominal (hindquarter) amputation *Brit J Surg* 22 671-693 Apr 1935
- 6 Gordon Taylor G and Patey D H Further review of intertrunculo-abdominal operation based on 21 personal cases *Brit J Surg* 34 61-69 July 1947
- 7 Pack G T and Ehrlich H E Exarticulation of lower extremities for malignant tumors, hip joint disarticulation (with and without deep iliac dissection) and hemipelvectomy (hemipectomy) *Ann Surg* 144 1-27 July 1946
- 8 Beck N R and Bickel W H Intertrunculo-abdominal amputations report of 12 cases *J Bone & Joint Surg* 30-A 201-209 Jan 1948
- 9 Ariel I M and Hark F W Disarticulation of innominate bone (hemipectomy) for primary and metastatic cancer *Ann Surg* 130 76-99 July 1949
- 10 Wise R A Hemipelvectomy for malignant tumors of bony pelvis and upper part of thigh *Arch Surg* 58 867-874 June 1949
- 11 Slat J H Hindquarter (intertrunculo-abdominal) amputation *Ann J Surg* 80 142-160 Aug 1950
- 12 Coley B L Higinbotham J L and Ramirez C Hemipelvectomy for tumors of bone report of 14 cases *Ann J Surg* 82 27-43 July 1951
- 13 Fink D and Stetquist J Transiliac amputation *J Bone & Joint Surg* 25 351-367 Apr 1943

# Thoughts on the Ellis-van Creveld Syndrome

## Report of an Analogous Case

RONALD A. MAIT Lieutenant MC USNR

**F**OR A SYNDROME to deserve a place in medical terminology, it must usefully correlate a set of anatomic, etiologic, or functional phenomena. Grouping together as a nosological entity independent variables that occur simultaneously only by chance serves no purpose. It is well, therefore, to review an established syndrome occasionally and affirm its right to a distinctive name. The appearance in our clinic of a girl with multiple congenital anomalies has directed us to a reconsideration of the Ellis-van Creveld syndrome.

This syndrome, known also as chondroectodermal dysplasia (dwarfism, dysplasia of certain epiphyseal centers, teeth, and nails, and polydactylism), has been definitely identified in 11 patients,<sup>1-11</sup> in 9, congenital heart disease was present. Other cases have been reported,<sup>12-14</sup> but either they are not truly representative of the syndrome, or they are not described in sufficient detail to enable the diagnosis to be confirmed from the reports alone.

The earliest descriptions of the disease involved accepting heart disease as an integral part of the syndrome. Coffey,<sup>15</sup> however, pointed out that the only true distinguishing abnormalities were maldevelopment of certain epiphyseal centers, notably those of the proximal tibiae and of the carpal bones, presence of an extra digit, and shortening of the distal long bones. Gellis<sup>16</sup> expressed a point of view even further removed from that of the physicians who first described the syndrome. He did not fully accept the group of malformations as representing a valid and unique syndrome, and pointed out that the Ellis-van Creveld syndrome could represent only fortuitous occurrence of isolated developmental defects otherwise seen alone or in smaller groupings.

When we recently saw a 9 year old girl with dwarfism, bone deformities, dysplasia and aplasia of the teeth, mongoloid facies, and pseudotruncus arteriosus, we thought at first that she represented a variant of the Ellis-van Creveld syndrome. Study re-

vealed that the child was in fact a curious combination of inherited and acquired abnormalities that made her but a counterfeiter of the syndrome. Her case is reported not only for its own interest but also because it may serve as an example of the way in which inherited traits can be overlaid with defects acquired during intra uterine and extra uterine life and the resultant become known as a syndrome—if the same chain of circumstances happens by chance three times.

### CASE REPORT

The patient was born on 13 November 1947 the daughter of healthy young parents with no history of consanguinity. Prenatal development had been complicated by the appearance of progressive polyhydramnios beginning at the fifth month of gestation. Delivery was by low forceps three days after rupture of the fetal membranes.

Immediately after the child's birth the attending physician noted cyanosis, a hemangioma of the forehead and extremely short arms and legs. Inquiry revealed that a maternal aunt had short arms and that the hemangioma had been present in at least four successive generations on the maternal side of the family. There was no family history of diabetes, syphilis or of any other developmental abnormalities but there was a marked history of allergy.

From 1948 to 1951 the patient was seen annually at the Johns Hopkins Hospital by Drs. Harriet G. Guild and Helen Taussig. A diagnosis of truncus arteriosus with left aortic arch was made. Chondrodystrophy was also considered, but as follow up roentgenograms revealed no abnormality this possibility was discarded. Pertinent physical findings during those years were short stature, cyanosis and a soft blowing systolic murmur heard over the precordium. The hematocrit was 55 ml per 100 ml. Roentgenograms of the chest were compatible with the diagnosis of truncus arteriosus. Electrocardiographic findings were consistent with right ventricular hypertrophy.

Cardiac catheterization was performed in 1952 at the U S Naval Hospital Bethesda Md following consultation at this school. Because atrioventricular dissociation developed, the catheterization had to be terminated and studies are incomplete. The following data were obtained: right ventricular pressure 100/0 mm Hg, superior vena cava oxygen saturation 13.6 ml per 100 ml, right ventricle 11.4 ml per 100 ml. The truncus could not be entered.

Angiocardiography demonstrated flow of the contrast medium from right atrium to right ventricle and thence to a large truncus. Some contrast medium flowed from the right ventricle into the lung fields perhaps signifying a small pulmonary artery. Large retroesophageal collateral bronchial arteries were demonstrable. The questionable presence of a pulmonary artery resulted in a change of diagnosis to that of pseudotruncus arteriosus.

Multiple dental extractions were performed in 1954 for relief of caries and periapical granulomata and abscesses

The patient was examined for the second time at this school in 1956. She was 9 years old and in the 20th centile for weight (25.2 kg, 55.5 lb) and under the 3d centile for height (120 cm, 47.2 in.). Her arms and legs were short in proportion to the trunk (fig. 1), and there was limitation of radial deviation of the wrists. The forehead was prominent, the nose broad and flat, and the epicanthal folds distinct. A large bluish capillary hemangioma was present in the middle of her



Figure 1 Photographs of the patient at nine years. Relative shortness of the forearms and clubbing are apparent. The mongoloid facies and frontal hemangioma are not so striking in the picture as they are in life.

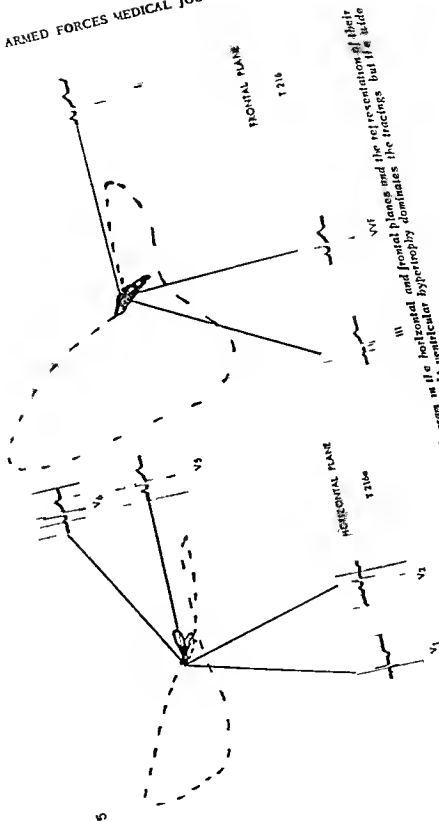
U S NAVY  
MEDICAL

Figures 2 and 3 Posteroanterior and left anterior oblique roentgenograms.  
Prominent features are the concavity in the region of the pulmonary artery  
and hypertrophy of both ventricles

ailed no abnormality. A few per-  
 use were malformed and carious  
 it appeared normal, and the thyroid



*ity of the distal radius imperfect radiocarpal artic-  
 and short bones of the forearms are characteristic*



Figures 5 and 6. Loops refer to the vectorcardiogram in the horizontal and frontal planes and the representation of their axial projections as conventional electrocardiograms. Right ventricular hypertrophy dominates the tracings but the axial angle is clearly seen in the horizontal plane.

Roentgenograms for cardiac configuration (figs. 2 and 3) showed the presence of right and left ventricular hypertrophy and retroesophageal blood vessels. A concavity was present in the region of the pulmonary artery; no "shelf" was seen in the left anterior oblique view. Pulmonary vascular markings were slightly less prominent than normal. Full mouth films showed the absence of buds for both upper lateral incisors. All other teeth were present but most were unerupted. Roentgenograms of the forearm were diagnostic of Madelung's deformity (fig. 4). Other long bones were not abnormal. The bone age was about 6½ years.

Conventional electrocardiograms were indicative of right ventricular and atrial hypertrophy. The loop representing the vectorcardiogram was a classical example of findings in right ventricular hypertrophy (figs. 5 and 6).

On the Stanford-Binet scale the IQ was 102.

### COMMENTS

The clearly inherited traits in this case are the frontal hemanjioma and Madelung's deformity. The relation of the hemanjioma to the rest of the patient's disease is ill defined. Madelung's deformity has been shown to be a dominant characteristic,<sup>16</sup> in this case, the patient's maternal grandfather probably also had the deformity. On this background of heredity is superimposed a pattern of delayed growth secondary to congenital cyanotic heart disease, yielding in combination the picture of a malformed dwarf.

The contribution of intra uterine life to the composition was pseudotruncus arteriosus. Whether a primarily blighted ovum evoked polyhydramnios, or whether a maternal abnormality manifested by polyhydramnios resulted in congenital heart disease is a matter for conjecture.

Between these two rather definite extremes of nature and nurture lies the ectodermal dysplasia. In its most obvious form, ectodermal dysplasia results in absence of many teeth, deformity of those present, maldeveloped fingernails and hair, and defects in the growth of the facial bones, for the most part the disease is sporadic. In this case, the dysplasia is in evidence by absence of two toothbuds, alleged defect in the quality of the enamel of the deciduous teeth and perhaps, in association with a mesodermal defect, also by the broad flat nose, prominent forehead, and epicanthal folds suggesting mongolism.

Comparison of this case with examples of the Ellis van Creveld syndrome reveals some obvious parallels. Each has a well known hereditary component—in one case, Madelung's deformity, in the other, polydactylism. Each has a factor of sporadic occurrence—namely, ectodermal dysplasia. Each has a form of dwarf-



ism. In our case the dwarfism is probably subsequent to life long hypoparathyroidism, in the Ellis van Creveld syndrome its etiology is not known but it is likely that it is related to the epiphyseal dysplasia. The congenital heart disease common to the two diseases is both statistically and inductively a product of intra uterine existence.

As a result of these comparisons it seems that Cellis' view of the Ellis van Creveld syndrome has much merit. The syndrome could be explained by chance occurrence of unrelated factors as in our case. On the other hand, the unique skeletal deformities delineated by Caffey are constant phenomena in the well documented cases of the syndrome and there is some evidence that a recessive gene is responsible for the chondroectodermal dysplasia. Thus if a syndrome does exist, it seems logical to restrict the definitive characteristics to lesions of bone, and perhaps also of ectoderm as Caffey has done, and place the element of congenital heart disease in the background.

## SUMMARY

The case of a 9 year old girl with dwarfism, Madelung's deformity, partial ectodermal dysplasia, and pseudotruncus arteriosus is presented to show how genetically determined traits were intermixed with acquired traits to yield the final clinical picture. Comparison is made with cases of the Ellis van Creveld syndrome. Certain similarities which are noted lead to the proposal that the definitive manifestations of chondroectodermal dysplasia and that the congenital heart disease usually present be regarded merely as an accessory abnormality.

## REFERENCES

1. Ellis R & B. Madelung's deformity and Ellis van Creveld Syndrome characterized by ectoderm dysplasia polydactyly chondrodysplasia and congenital morbus cordis. *Arch Dis Childhood* 35 65-84 June 1940
2. Gatt L. Ellis-van Creveld-Syndrome. *Hebber paediat. acta* 6 437-442 Nov 1951
3. Ellis R & B. D. V. Chondro-ectodermal dysplasia (Ellis van Creveld syndrome). *Proc Roy Soc Med.* 44 731-732 Aug 1951
4. Caffey J. Chondro-ectodermal dysplasia (Ellis van Creveld syndrome). *Am J Roentgenol* 68 875-886, D.C. 1952
5. Madell M. La sindrome di Ellis e van Creveld o chondrodysplasia ectodermica (contributo di un caso). *Pediatr internaz* 4 127 Jan-Mar 1954
6. Weiss H. and Caffey J. *Pediatr* 46 268-275 Mar 1955
7. Chausse J. Chondro-ectodermal dysplasia (Ellis van Creveld syndrome). *Arch Dis Childhood* 35 213-217 Aug 1955
8. Turner E. H. Ellis-van Creveld syndrome. *report of case*. *M. J. Australa* 1 366-367 Mar 3 1956
9. K. and D. P. R. and Sch. L. J. H. Ectodermal dysplasia is a chondrodysplasia and congenital morbus cordis. *Am. J. Dis Child* 82 341-344, Sept 1951
10. Debr R. Lamy M. and Caffey J. *Am J. Dis Child* 82 341-344, Sept 1951
11. Ellis van Creveld. *Arch. franc. pediat* 9 65 1952

11 Debre R Lamy M, Minkowski A and Giombach R Syndrome d Ellis van Creveld chez un nouveau-né decede le premier jour *Arch franç pediat* 9 1055-1058 1952

12 Gallagher F J MacGregor M F and Israelski M Chondrodystrophy with ectodermal defects *Arch Dis Childhood* 28 14 18 Feb 1953

13 Metrakos J D and Fraser F C Evidence for hereditary factor in chondroectrodermal dysplasia (Ellis van Creveld syndrome). *Am J Human Genet* 6 260-269 June 1954

14 Thomas C (Nancy) and Algan B Aspect ophtalmoscopique dans un cas de maladie d Ellis-van Creveld *Bull Soc opht France* 853 854 Oct 1953

15 Gellis S (editor) Editor's note Year Book of Pediatrics 1953 1954 The Year Book Publishers Inc Chicago Ill 1954 p 332

16 Schinz H R Baensch W E Friedl E and Uehlinger E Roentgen-diagnostics Based on the 5th German edition English translation arranged and edited by J T Case Grune & Stratton Inc New York N Y 1951 Vol 1 part 1 pp 789-792

#### NATURAL HISTORY OF HERPES ZOSTER

"The course of herpes zoster was studied in a series of 206 patients that included infants and octogenarians. There were 32 patients under the age of 20 in 30 of these (94 per cent) the condition cleared up in 14 days or less. The infection was more severe and prolonged in older patients. In four elderly patients symptoms persisted six months or longer. The relative frequency with which the various parts of the nervous system were involved varied from youth to old age. No instance of involvement of the ophthalmic division of the trigeminal nerve was observed in patients under the age of 20 but ocular complications did not appear to be related to the aging process. Post herpetic neuralgia did not occur in patients under 20 but was frequent in patients over 50. Sex race and season did not perceptibly influence the incidence of infection in this series."

—CARROLL F BURGOON Jr M D

JANE S BURGOON M D

G DOUGLAS BALDRIDGE M D

in *Journal of the American Medical Association*  
p 265 May 18 1957

## Departments

### A MESSAGE FROM THE A M A

In its present form, Asian influenza, caused by a new virus mutant, is only temporarily disabling. Even so, it could strike enough military personnel to cause serious disorganization in our military departments, at least on a short term basis. Service sent specimens of the virus from the Far East last April to the Walter Reed Army Research Center in Washington, D C, for typing. More recently, with indications of a probable epidemic outbreak of the disease in this country, a determination was made to vaccinate military personnel, since the disease is highly contagious and spreads very rapidly. Arrangements have been made with the manufacturers of the vaccine to earmark part of their output for military use.

The American Medical Association, in co-operation with the Public Health Service, has launched a nation wide preparedness program to combat an outbreak of Asian influenza among the civilian population in this country. The A M A Board of Trustees, in July, designated its Committee on Civil Defense, Council on National Defense, as a Special Committee on Influenza to implement a program of action designed to mobilize medical manpower and institute other precautionary measures to cope with any influenza outbreak this fall and winter.

The A M A program consists of an informational and an operational phase. The informational phase got under way on 26 July, when packets of material on Asian flu were sent to members of the A M A House of Delegates, presidents of state medical societies, secretaries of county medical societies, and chairmen of state emergency medical service committees. National allied health and medical associations have been urged to assist and co-operate and to ask their constituent bodies to join with local medical societies in formulating plans for co-operative efforts.

For the past two months, a series of articles has been published in the *Journal of the American Medical Association* covering historical and scientific aspects of the disease, together with reported and confirmed incidence rates being tabulated by the Public Health Service. Articles have also appeared in

From the Council on National Defense of the American Medical Association. The views and opinions expressed are not necessarily those of the Department of Defense.

—Editor

*Today's Health* provides information as to what the general public should expect and what to do. If and when the epidemic becomes nation wide in scope, A M A representatives will be put on network television and radio programs to provide the public with information on home care and precautionary measures.

In its operational program, the Association has informed state and county medical societies of the possible impact of an influenza epidemic on normal professional services and facilities. The Special Committee on Influenza has continued to urge local medical societies to develop adequate stand by programs and plans to cope with the problem. State emergency medical service committees have been alerted to institute precautionary measures and to see that proper organizational plans are coordinated and readied in each state medical society. The Committee suggested that consideration should be given to expanded professional care through the utilization of all physicians, regardless of type of practice. Local plans should include mobilization of other professional resources, such as nurses, nurses' aides, pharmacists, and others. Action to make full use of hospital facilities should be explored, such as curtailment of elective surgery and diagnostic studies. It is essential that state and local programs be closely coordinated with public health agencies and state and local health departments.

The Committee has been particularly impressed with the prompt attention and serious consideration which this problem is receiving at state and county levels. Within three weeks after the Association pledged its support and participation in a plan to alert the nation's practicing physicians to the dangers of a possible influenza outbreak, many state and county medical societies reported the programs they had set up and the enthusiastic response which was being given by individual physician members.

Dr. David B. Allman, A M A President, Atlantic City, at the time the program was instituted said, "The epidemic may not strike in this country, but the American Medical Association is anxious to have practicing physicians mobilized and alerted in case an outbreak does occur. Thousands of persons have been stricken with the disease in the Far East, and it is only good medicine to deal in probabilities now, when we have the time. In that way, the American people will be best served from a medical standpoint."

## AMERICAN PUBLIC HEALTH ASSOCIATION TO MEET IN CLEVELAND

The 85th annual meeting of the American Public Health Association and meetings of some 40 related organizations will be held in the Cleveland Public Auditorium, Cleveland, Ohio, from 11 to 15 November 1957. In addition to the presentation of a large number of papers, there will be many technical exhibits. This year's APHA meeting will include many research reports on subjects related to the maintenance of a healthful environment and an aggressive attack on disease and disability. Of about 400 scientific papers to be presented in 75 sessions, more than half will concern research accomplishments or opportunities.

Considerable interest will center around a session on radiation protection which is scheduled for Wednesday morning. The session will include a symposium on current status in setting radiation exposure standards, a scientific paper on community health problems due to peacetime uses of radiation to be presented by Roy J. Morton, associate director of the radioactive waste disposal research project at Oak Ridge National Laboratory, and president-elect of the association, and a paper on program planning for radiation protection to be presented by Dr. Herman E. Hilleboe, New York State health commissioner, and Alexander Rahm, Jr., chief of the radiological health section of the New York State Department of Health.

Another session of timely interest will be a panel discussion on influenza including epidemiology, status of vaccine production and utilization, control measures, and laboratory services. This session is scheduled for Thursday morning.

Other topics will include health implications of new food and milk processes including use of chemicals and antibiotics, freezing and irradiation, the effects of housing quality on morbidity, food implications of changes in the American pattern of diet, and developments in mental health including school and community programs and new programs for retarded children.

There also will be discussion of new research implications for detection and measurement of air pollution, developments in sanitary control of drinking fountains, home swimming pools, hotels, motels, and tourist homes, and technical developments in fluoridation including experience in maintaining constant fluoride concentrations and possibilities for fluoridating individual water supplies.

The problems of habituating drugs in industry development and testing of new chemicals to combat cancer statistical studies on perinatal mortality, prematurity, and the epidemiology of cancer and other diseases, and new patterns of medical care programs in hospitals and elsewhere will be covered

Four general sessions are scheduled On Monday morning, prominent national leaders will take part in a symposium on public policy aspects of public health planning Tuesday evening's session will feature addresses by the Association's president, Dr John W. Nutson, assistant surgeon general and chief dental officer of the U S Public Health Service, and Dr Lowell J. Reed, president emeritus of Johns Hopkins University The Sedgwick Memorial Medal will be presented at this session Lasker Awards of the American Public Health Association for 1957 will be presented Thursday evening A closing symposium Friday afternoon will focus on public health priorities for 1958

---

## DEATHS

ELLENBERGER, William Captain, DC, USNR of Milwaukee, Wis stationed at the U S Naval Air Station Willow Grove, Pa graduated in 1925 from Marquette University Dental School, Milwaukee, Wis appointed a Lieutenant in the United States Naval Reserve 1 June 1943 ordered to active duty 11 August 1943 died 6 July 1957 age 55 at Hatboro, Pa, of arteriosclerotic heart disease

HATCHER, Dock Thomas, Jr, Lieutenant MC USN of Butler, Mo stationed at the U S Naval Air Station, Glynn, Brunswick Ga graduated in 1950 from the Baylor University College of Medicine Houston Tex served in an enlisted status in the United States Naval Reserve on active duty, 1 March 1944 to 26 October 1945 appointed a First Lieutenant in the Army of the United States 9 September 1952, resigning 30 September 1954 appointed a Lieutenant in the United States Navy 19 May 1955 died 6 July 1957 age 30, at the U S Naval Air Station Glynn Ga, by drowning

MEYERS Doris Ann First Lieutenant USAFR (NC) of St Petersburg, Fla stationed at the 3920th USAF Dispensary 3920th Air Base Group APO 147 New York, N Y graduated in 1953 from the Charity Hospital of Louisiana School of Nursing New Orleans La appointed a Second Lieutenant in the United States Air Force Reserve 12 December 1954 ordered to active duty 20 February 1955 died 27 July 1957 age 24, at the Cheltenham General Hospital, Cheltenham, Gloucestershire England as the result of an automobile accident

# OFFICERS CERTIFIED BY SPECIALTY BOARDS

## Supplementary Listing

According to information from the Offices of the Surgeons General of the military medical services, the following regular Medical Corps officers have been certified by the boards indicated since the listings published in previous issues of this Journal

### American Board of Psychiatry and Neurology Psychiatry

Leonard J. Edrshaw Lt. Col. USAF

### American Board of Orthopaedic Surgery

William C. Castrell Capt. USA

### American Board of Dermatology and Syphilology

Judson H. Jenkins Comdr. USN

### American Board of Urology

Charles W. Lewis Jr. Comdr. USN

### American Board of Obstetrics and Gynecology

Charles F. Clime Jr. Comdr. USN

Kenneth V. Owens M.D. USA

Quincy E. Fort Jr. Maj. USAF

Dan M. Shook Comdr. USN

Deane E. McLeod Lt. Comdr. USN

D. W. S. True Comdr. USN

Vernon J. Merkle Lt. Comdr. USN

Peter F. Wells II Lt. Comdr. USN

Frank Ostrowicz Lt. Comdr. USN

W. H. M. Wolf Lt. Col. USA

### American Board of Internal Medicine

Rodney R. Gleyson Capt. USN

L. Y. M. F. x Lt. Comdr. USN

### American Board of Ophthalmology

Richard E. Lawrence Comdr. USN

### American Board of Surgery

Janet A. Mendison Capt. USA

Harry P. Mahan Comdr. USN

### American Board of Neurological Surgery

Rbert A. M. delsohn M.D. USAF

### American Board of Preventive Medicine

#### Aviation Medicine

Paul W. Musgr M.D. USAF  
Don P. P. T. Lt. Col. USAF

Donald M. Alders Col. USAF  
Charles H. Bramlett Col. USAF

## REHABILITATION AND EMPLOYMENT OF THE PHYSICALLY HANDICAPPED

Members of the Armed Forces of The President's Council on Handicapped, which will be observed during 6 to 12 October. President Eisenhower evinces his concern for the employment

have a special interest in the activities of the Council on Employment of the Physically Handicapped. The following message from President Eisenhower expresses his concern for the furtherance of such efforts.

There is one basic thing to remember about the physically handicapped. It is good business for the person. It makes no sense to be relatively helpless. I understand this and am helping workers

employment of workers who are physically handicapped. It is good business for the nation and good for the individual. I like to congratulate the citizens who would otherwise be unemployed and who are now employed.

Now we must tell others about the physically handicapped because two million Americans are still waiting to be used. Two million Americans could enter the labor force today if they were properly prepared.

the value of employing the physically handicapped. Americans with physical handicaps are still waiting to be used. Americans could enter the labor force today if they were properly prepared.

I urge all employers to employ the physically handicapped wherever possible. I urge all workers to accept the physically handicapped as their coworkers. In these demanding times the cooperation of our nation is our most precious asset. Working together the handicapped can add spirit and power to America as we seek to improve the standard of living for the world.



## SIX MEDICAL CORPS OFFICERS SELECTED FOR GENERAL OFFICER AND FLAG RANKS

Five Army and Air Force Medical Corps officers holding important professional assignments have been promoted recently to general officer and a Navy captain has been selected for rear admiral. The new Army general officers are Brigadier Generals Thomas J. Hartford, MC USA, deputy commanding general of Walter Reed Army Medical Center; James C. Forsee, deputy commanding general of Walter Reed Army Hospital; and Carl W. Tempel, commanding general of Valley



General Hartford



General Forsee



General Tempel



Captain Kenney



General Brounton



General Cullen

Forge Army Hospital near Philadelphia. The Navy selected for promotion Captain Edward C. Kenney, MC USN, who was decorated for "extraordinary heroism" at Guadalcanal and now commands the U.S. Naval Hospital Bethesda. Major General S. Brown, director of the staff in the office of Assistant Secretary of Defense Frank B. Berry, and John K. Cullen, director of plans and hospitals in the office of Major General Dan C. Ogle, surgeon general of the Air Force.

## Reviews of Recent Books

**WORLD-ATLAS OF EPIDEMIC DISEASES, Part III, First of four issues,** edited by Professor Dr med Ernst Rodewaldt and Privatdozent Dr med habil Helmut J Juxatz Heidelberg, under the sponsorship of the Heidelberger Akademie Der Wissenschaften 36 pages 10 colored maps in hard back binder, 15 $\frac{1}{2}$  by 19 inches in size, loose-leaf with three brass screw posts, of size suitable for insertion of forthcoming second, third and fourth issues Volk-Verlag, Hamburg 1 Germany, 1957 Price DM 75, plus extra charge for postage and packing

This first issue of Part III of this world atlas provides continuation of the geomedical presentation of epidemic diseases. Parts I and II have been reviewed in previous issues of the *U S Armed Forces Medical Journal*. This volume contains descriptive sections and color maps pertaining to the following topics: brucellosis in Europe, rabies, schistosomiasis in Africa, plague, leishmaniasis and filariasis in the Americas, yellow fever and schistosomiasis in South America. Also included are recent (1949-1954) data on the composition and distribution of populations in South and Central America.

In these days of rapid global travel these atlases provide a valuable addition to the literature on geomedicine. Differing from those books which provide the reader a summary of all diseases of importance in a particular area or country, the approach of the atlas is to present a more detailed description of a single disease on a continental or multicontinental basis. Notable features in relation to the zoonoses are the tabulations and distribution mapping of potential animal hosts and vectors with adequate reference to sources of information.

The descriptive summaries are concise and defined within the span of years. As witnessed by the section on yellow fever in South and Central America, the summaries are accurate and up-to-date for the defined period. In the case of dynamic diseases, however, even a few years bring many changes and it is hoped that supplements will keep the information as current in future years as it is now. These atlases are a must for the military medical library, the medical school, health departments concerned with international travel and as a source of reference for all others who are concerned with geomedicine.

—JOHN P SEAL, CAP, MC US.

**RHEUMATIC DISEASES, RHEUMATISM AND ARTHRITIS,** by Kenneth G Brugsch M D, F A C P 330 pages illustrated J B Lippincott Co, Philadelphia, Pa, 1957 Price \$10

This monograph describes the anatomic physiology, physical examination, diagnostic procedures, and treatment of rheumatic conditions.

A separate chapter is devoted to laboratory procedures but whether this should be included in such a volume or left to a text on laboratory procedures is debatable

The author has included a separate chapter on treatment as well as a section on the therapy of each clinical entity presented To this reviewer this appears to be reduplication There is a chapter for each of the commonly classified rheumatic diseases each of these entities is presented in comprehensive sequence One does not find psychogenic rheumatism as a clinical entity The author has included a worthwhile chapter under the heading of "Diseases Simulating Rheumatic Diseases" Side effects of therapeutic agents are discussed and the more common features presented This chapter might have been expanded further

References are listed at the end of each chapter Some of the more recent works such as Rammelkamp's on rheumatic fever have been omitted The text is easily readable well indexed and adequately illustrated Although the format of this volume is a little unusual it is a worthwhile text and reference book

—FRANCIS W PRUITT Col MC USA  
by Jack R Ewalt M D Edward A  
and Franklin G Ebaugh M D 8th

**PRACTICAL CLINICAL PSYCHIATRY**  
Strecke M D Sc D LL D The Blakiston Division McGraw-Hill Book Co Inc  
edition 457 pages New York N Y 1957 Price \$8

This is the eighth revision of a textbook first published by Strecke and Ebaugh in 1925 The major part of the present revision apparently was done by Dr Ewalt It has a new format and is a larger book bulk wise than the seventh edition however it contains less material and is larger primarily by virtue of the fact that this edition is printed on thicker paper The book is divided into three sections including seven chapters on "Basic Concepts" 17 chapters on "Clinical Syndromes" and 13 chapters on "Treatment" Chapter 12 Mental Deficiency was written by Malcolm J Farrell M D and chapter 24 Child Psychiatry and Mental Health Practices was written by Warren T Vaughan Jr M D The new psychiatric terminology adopted by the American Psychiatric Association and the American Medical Association is used throughout

For the most part the subject matter presented in the various chapters is of good quality and informative particularly for the beginner or the medical student This reviewer however objects to the deletion of much of the illustrative clinical material In the preface the authors stated that because of the increase of clinical material in clinics and reaching facilities the inclusion of such descriptions in a textbook is no longer necessary It is the feeling of this reviewer however that particularly in psychiatry wherein one deals so frequently with the intangible manifestations of illness and their effect upon the personality illustrative clinical material is essential to provide information to the general practitioner medical students and the be

October 1957)

REVIEWS OF RECENT BOOKS

1515

ginner in psychiatry to assist in differentiation of the various nuances and clinical manifestations of psychiatric illness

The sections on "Basic Concepts" and on "Treatment" are particularly good and well worth reading. The clinical syndromes might have been amplified by a more detailed discussion of the character and behavior disorders that appear. This is a group of disorders which all psychiatrists have a tendency to neglect, but about which many questions arise among personnel working with social agencies, the police, child guidance groups, and public institutions. This book has much to offer, but its over all value is less than that of the previous edition despite the addition of a considerable amount of up-to-date material. It may not sustain its previous popularity in competition with other textbooks of its type.—ROY F. CLAUSS, Jr., Lt. Col. MC USA

WILLIAM HARVEY, His Life and Times, His Discoveries, His Methods  
by Louis Chauvois. Foreword by Sir Zachary Cope. 271 pages, illustrated. Philosophical Library, Inc., New York, N. Y. 1957. Price \$7.50

It is most fitting and proper that in this year, A. D. 1957, on the tercentenary of the death of William Harvey, we have an opportunity to assay his life and his works. In this compact volume, Doctor Louis Chauvois, The Laureate of the Institute and the Academy of Medicine, (Paris) and an eminent medical historian, has drawn a vivid picture of this great English physician that is unique and refreshing. While drawing deeply upon past and contemporary biographers, he has studied Harvey's immortal classic "De Motu Cordis et Sanguinis," written in Latin and first published in Frankfurt in 1628.

Writing with Gallic enthusiasm, Dr. Chauvois impresses the reader with the obstacles in Harvey's path, centuries of erroneous hypotheses and theories which he questioned and refuted by years of experiments and observations on the circulation of the blood. Harvey's burning curiosity, his perseverance, his clear thinking, noticeable even during his medical school days at Padua, are brought to light. Dr. Chauvois has well evaluated and utilized his sources of material. His opinions on Harvey's classic discovery are noteworthy, while his own are added on the subject of circulation of the blood. He has given due credit in his modest bibliography, and tells the reader when he assumes a divergent point of view.

This book will stimulate thoroughly the student of medical history into a new appreciation of the momentous impetus which Harvey gave to the advancement of science. Harvey lived into his 80th year. At 72, he allowed to be published "De Generatione Animalium" upon the urging of one of his students, saying at the time "Nature however is the best and most faithful interpreter of her own secrets, and what she presents, either more briefly or more obscurely in one department, that she explains more fully and clearly in another." Harvey was memorialized this past June in the Library of Congress Exhibit of

1546

# U S ARMED FORCES MEDICAL JOURNAL

(Vol 8 No 10)

the Month which showed a copy of his "Complete Works published in London in 1766 and a copy of "De Motu published in Padua in 1643 All physicians should delight in this book Such an outstanding medical forebear is worthy of our attention and admiration

—PAUL V DAVIS Col USAF (MC)

PRACTICAL OTOLARYNGOLOGY by Gervais Ward McAniff M D F A  
C S F I C S 320 pages illustrated Landaberger Medical Books  
Inc 1957 Distributed by The Blakiston Division McGraw-Hill Book  
Co New York N Y Price \$7

This is an excellent text for the senior medical student the general practitioner and the specialist in aviation medicine The author has considered the difficulties encountered by the general practitioner and the reasons behind these difficulties Briefly but adequately he presents applied anatomy and physiology sufficient to permit an understanding of disease when one or both are altered Of equal importance the art of medicine is stressed as well as the science and the practice of conservatism An excellent section is devoted solely to the physical and functional examination of the ears nose and throat presented superbly because of its clarity and completeness Most errors in diagnosis are a result of incomplete examination A clear description of the recognition and treatment of those minor surgical conditions by the physician who first encounters them is presented These include polypectomy antral irrigation foreign body removal and the immediate treatment of fractured nasal bones All of the conditions requiring medical or surgical care when first seen are described in detail and in excellent fashion Thorough study of this text with its easy reading will enable the untrained in otolaryngology to treat many diseases of the ears nose and throat

This text is of immense value to the flight surgeon and should be at hand as a ready reference The youngest flight surgeon engaged in air crew effectiveness finds his greatest difficulty in the recognition and treatment of diseases of the ears nose and sinuses sometimes resulting in serious sequelae A thorough acquaintance with this text will greatly enhance the therapy of the sick flyer and preclude the serious sequelae and a high noneffective rate

—FRANK A PERRI Col USAF (MC)

CLINICAL ORTHOPAEDICS No 8 Chronic Hereditary Disease and Developmental Anomalies Anthony F DePalma Editor in Chief 337 pages illustrated J B Lippincott Co Philadelphia Pa 195 Price \$7 50

There is much thought provoking and valuable material in this volume of Clinical Orthopaedics The first section is devoted to chronic hereditary diseases and developmental anomalies with articles by 15 authors from this country and abroad orthopedists anatomists and generalists Of particular practical interest is an article by Denis Brown on planning

The second section entitled "General Orthopaedics" contains 11 articles An excellent one on hemophilic arthropathy is based on an

analysis of 117 hemophilic families and includes a discussion of the correction of resulting joint deformities. Another presents the scapulocostal syndrome as a little known entity. There are two readable discussions of the public relations aspects of a physician's life, financial and medicolegal. The other papers in this section are on various clinical subjects.

The third section on motorist injuries is Part II of the symposium begun in the preceding *Clinical Orthopaedics* Number 7. This installment deals with automobile crash injury research on reduction of injuries. The medical profession, which has long considered the automobile accident as a therapeutic problem, is rapidly coming to think of it in terms of preventive medicine, and to apply medical knowledge to all causative factors, even automobile designing. To quote Doctor McElhenny from another section of this volume: "The motor car manufacturers need top medical thinking. We need cars designed to preserve life and limb."—MILTON S. THOMPSON, Col MC USA.

**THE TREATMENT OF WOUND SHOCK.** The Wound Shock Working Party, Medical Research Council Memorandum No. 34. 39 pages. Published by Her Majesty's Stationery Office, London, England, 1957. Price 3s. 6d. oct.

This small paper backed manual of 39 pages, written by the Medical Research Council and the working party for revision of Medical Research Council War Memorandum Number 1 from the privy council of Her Majesty's government of London, England, is divided into two parts. The first part discusses the nature and assessment of wound shock, while the second part concerns treatment which includes general and specific methods. An excellent descriptive text of assessment of blood loss and shock, including different types of shock, are brought out in such a fashion that this manual becomes of great value especially for younger doctors and medical students, and as an excellent review for more experienced, practicing physicians and surgeons. The abuse and use of blood and plasma expanders is rationally presented and the underlying physiology is explained.

In part two, which deals with treatment, general and specific measures are adequately presented and specific details are brought out on choice of fluid, amount of blood, rate of transfusion, and lack of response to transfusion. A discussion on the type of anesthesia utilized and a fine discussion on postoperative care are presented. Some modifications of treatment on special types of injuries and the metabolic consequences of injuries are noted. A discussion of fat embolism and anuria due to crush syndrome and other severe injuries is very adequately explained and specific therapy is indicated. There is an excellent rapid treatise on burns and, in the appendixes, a useful section on the use of plasma substitutes. The paper concludes with an appendix on untoward reactions following transfusions and the therapy thereof. In general this is an excellent manual for quick and ready reference for the treatment of traumatic injuries either due to blunt

trauma missile trauma or burns It is highly recommended for medical students interns and residents and as a very rapid excellent reference for all practicing physicians and surgeons

—VICTOR C STRATTON Capt MC USN

PRACTICAL OFFICE GYNECOLOGY by Albert Decker M D D O G  
F A C S and Wayne H Decker M D D O G A Series of Monographs Obstetrics & Gynecology edited by Claude E Heaton M D  
388 pages 103 illustrations 19 in color F A Davis Co Phila  
delphia Pa 1956 Price \$10 50

This is a practical concise well illustrated 347 page manual dealing with all phases of office diagnosis and management of gynecologic problems Factors especially stressed are simplicity effectiveness and safety The first section deals with history taking physical examination and special office procedures Certain subjects are of necessity covered only in a cursory manner notably the section on hysterosalpingography The diagnosis and management of specific disease entities are adequately reviewed This section offers a succinct review of most of the gynecologic and treatment principles of practitioner in his office The diagnostic and treatment procedures generally are standard ones The currently acceptable principles of hormone therapy are discussed in an excellent chapter which includes a complete table of commercial preparations The importance of early cancer detection is repeatedly stressed throughout the book and one entire chapter is devoted to the diagnostic aids to this end There is a complete and extensive bibliography The volume admirably fulfills its purpose in serving primarily as a useful manual for the student and as a succinct refresher course for the practitioner The presentation is not nor is it intended to be on a level comparable with a classical standard gynecologic text —HUMBERT L RIVA Col MC USA

DISEASES OF THE NOSE THROAT AND EAR by Howard Charles Ballenger  
M D F A C S and John Jacob Ballenger B S M S M D 10th  
edition 968 pages 550 illustrations and 11 plates in color Lea &  
Febiger Philadelphia Pa 1957 Price \$17 50

This new edition has been brought up to date and many surgical techniques such as rhinoplasty and submucous resection are described in detail The section on respiratory physiology is brief but excellent In the one on sinusitis there is a complete description of the various operations upon the sinuses The section on the larynx includes Morrison's recent work on the anatomy of the recurrent laryngeal nerve and reconstructive procedures for vocal cord paralysis The description for the procedure of tracheotomy is adequate but there are too few illustrations

There is an excellent section on defects of speech which is a worthwhile addition to a book of this type The physician should have an understanding of speech defects and know when to refer patients with speech disorders for speech therapy The section on physiology of

hearing is shorter, concise and clearly understandable. The last chapter on bronchoesophagology, by Jackson, is a worthwhile adjunct.

Throughout this edition, there is a notable lack of description of the simple but commonly performed procedures, such as the treatment of nasal fractures and infraction of the middle turbinate. The section on acute diffuse otitis externa, the most common disorder of the external auditory meatus, is incomplete. Bacteriologic studies done during World War II by Senzawa, which show that the etiology of external otitis is rarely due to fungi, are not reported. Current methods of treatment of this common condition are not recorded. Despite its shortcomings, this is an excellent book for residents and specialists in otolaryngology. The lack of adequate description of simple procedures and treatment of the common disorders of the ears, nose, and throat limits its use for the general practitioner.

—RALPH L. ARALS, Lt Col USAF (MC)

**ANESTHESIOLOGY AND RELATED PROBLEMS** Conference Co-Chairmen: C. R. Stephen and F. J. deBeer. 180 pages, illustrated. *ANNALS OF THE NEW YORK ACADEMY OF SCIENCES*, Volume 66, Part 4, pages 841-1022, April 2, 1957. Editor-in-Chief, Otto V. St. Quintlock. Managing Editor, Franklin A. Furness. The New York Academy of Sciences, New York, N. Y., 1957. Price \$4.

The volume is published in the general format of a professional journal, and is divided into four major parts consisting of 16 separate articles by 24 authors.

The first part discusses geriatric anesthesia. Nutritional and hematologic factors like anemia and hypoproteineremia may be concealed and unrecognized unless specific laboratory procedures are performed. It is emphasized that hasty surgery must be avoided in the presence of uncorrected nutritional deficiencies. Cardiovascular complications are treated from the standpoint of reflex, chemical and metabolic depression of cardiac function, changes in peripheral vascular resistance, interference with venous return to the heart, acute cardiac failure, and coronary disease. Mechanical problems in the use of mechanical respirators on patients with high airway resistance and low pulmonary compliance are outlined. The choice of anesthetic drugs and methods must depend on an evaluation of the metabolic functions of each individual patient.

Part two reviews controlled respiration in anesthesia, beginning with a review of respiratory physiology and a comparison of artificial respiration with natural respiration. Effects of pressure breathing on systemic and pulmonary circulation are shown, and it is concluded that a normal individual will well tolerate controlled respiration supplied by any reasonable method. The methodology of controlled respiration is approached from the aspects of pharmacologic, mechanical, and combined methods, and a warning of the dangers in the method. The evolution of controlled respiration in anesthesia practice is traced.



and the author finds it inevitable and desirable that clinical application of controlled respiration will increase

The section on fluid and electrolyte balance in surgery begins with a discussion on the diagnosis and treatment of respiratory alkalosis. The article on fluid and electrolyte therapy in pediatric surgery contains useful tables on surface area and fluid requirements. The contribution of radioactive isotopes to the study of electrolyte balance in surgery is briefly evaluated.

The final part surveys hypotension in the operating room. The effects of some anesthetic agents on blood pressure, cardiac output, and peripheral resistance are noted. The problem of adrenocortical insufficiency during surgical anesthesia is presented. The role of the autonomic nervous system in causing circulatory reflexes resulting in hypotension is reviewed and schematically charted. The hemodynamic effects of sympathomimetic amines are charted. Protective mechanisms in shock on laboratory animals are presented.

This review of problem areas encountered by surgeons and anesthesiologists will be of value to the practitioner in his daily work and to the teacher as a discussion of four current teaching problems.

—ROBERT E. LAU, Lt Col, USAF (MC)

The Principles and Methods of PHYSICAL DIAGNOSIS. Correlation of Physical Signs with Certain Physiological and Pathological Changes in Disease. by Simon S. Leopold, M.D. with a Chapter on Sounds from the Thorax. Acoustic Principles by S. Reid Warren, Jr., Sc.D. in the 2d edition. 537 pages. 379 illustrations and 25 color plates. W.B. Saunders Co. Philadelphia, Pa. 1957. Price \$9.

The second edition of this textbook on physical diagnosis presents a completely revised and improved presentation of a book which in its first edition gained wide acceptance as a standard in this field.

This edition has been expanded from 430 to 537 pages. A chapter on the pediatric examination has been added to make the book of more general value. Another on medical history has been amplified and strengthened and the one on psychiatric concepts of human behavior including some of the recent psychiatric survey has been revised by Charts and drawings have been added to discussion of the neurologic examination to demonstrate the more common neurologic lesions and indicate the proper technique in such an examination. A number of electrocardiograms and phonocardiograms have been included which record better than words can relate the auscultatory signs of numerous cardiac abnormalities.

The number of colored illustrations have been increased and new photographs have been generously inserted throughout the book. As a result the text is even better illustrated than was the first edition. This book is recommended to the student as a standard textbook in the field of physical diagnosis.

—GEORGE M. POWELL, Col, MC USA

**CIBA FOUNDATION COLLOQUIA ON ENDOCRINOLOGY** Volume 10 Regulation and Mode of Action of Thyroid Hormones. Editors for the Ciba Foundation G. F. W. Wolstenholme D. B. F., M. A., M. B., B. Ch., and Elaine C. P. Miller A. H. & C. A. R. I. C. 311 pages, 114 illustrations. Little Brown & Co. Boston, Mass., 1957. Price \$8.50.

This book is the latest addition to the Ciba Foundation's *Colloquia on Endocrinology*. The field of thyroid physiology and pharmacology has become infinitely broader with the advent of more adequate tools for investigation. This book is an important contribution in presenting the latest concepts of thyroid physiology and pharmacology and in the discussion of these concepts the participants in this symposium are among the world's outstanding authorities on the subject. A definite attribute of the book is the excellent discussion at the conclusion of each paper.

Papers are presented concerning the nature of the thyroid hormone, possible conversion to more active principals, mechanism of action, interrelationship with other endocrine gland products, and the mechanism of control of thyroid output. The techniques of experiment used in gaining these data are described and differing points of view aired in the discussion of each paper. Clinical applications are alluded to wherever possible.

The book is most useful to those interested in research endocrinology and to those interested in thyroid physiology and pharmacology. The general internist will find it useful for reference.

—WILLIAM R. SCHILLHAMMER, M.D., MC USA

**Rypins MEDICAL LICENSURE EXAMINATIONS** Topical Summaries and Questions, edited by Walter L. Biering M.D. M.A.C.P. M.R.C.P. Edin. (Hon.) with the collaboration of a review panel. 8th edition. 964 pages. J. B. Lippincott Co., Philadelphia, Pa., 1957. Price \$10.

This is the eighth edition of this compendium of medical examination questions which in itself, is a tribute to its value and practicality. The book is divided into sections on the basic sciences and the various branches of medicine and surgery. Each section is compiled by a capable authority, who has written a summary of the salient facts in his field that covers briefly but in a logical and organized way the information usually asked by state licensing boards over the years as well as new developments which might be included. This plan seems much sounder pedagogically than a long series of questions and answers. There are questions aplenty for which the answers can be found in the epitome preceding.

Perhaps one of the most worthwhile and useful chapters gives examples of questions given. Particularly since the advent of multiple choice mechanically graded questions, the understanding of a new question format seen for the first time by a candidate in the throes of examination is often a stumbling block. Familiarity with multiple choice of facts, associated and related item lists, questions whose answers depend on previous answers, quantitative values and comparisons

cause and effect types and series of questions based on case histories is a great help before the examination room is entered

This book is excellent for its purpose and should aid the student or graduate. It is a good review for anyone

—JAMES L. TOBIN, Col USAF (MC)

The Clinical Management of VARICOSE VEINS by David Woolfolk Barrow M D with a Foreword by Arthur W. Allen M D 2d edition revised and enlarged 169 pages illustrated Paul B Hoeber Inc Medical Book Department of Harper & Brothers New York N Y 1957 Price \$6.

This well written and well illustrated small volume presents for the general practitioner and for the surgical resident most of the basic information needed relative to the diagnosis and treatment of varicose veins. The pen and ink drawings make the text easy to follow. The fact that so many of our patients in the older age group present peripheral vascular problems with increasing frequency makes this monograph a welcome addition to the physician's library

—PHILIP J. McNAMARA, Capt MC USN

ANNALS OF THE NEW YORK ACADEMY OF SCIENCES Volume 64 An 5  
Pages 735-1073 March 22 1957 Editor-in-Chief Otto V St Whitelock  
Associate Editor Franklin A. Furness \*SECOND TISSUE HOMO-  
TRANSPLANTATION CONFERENCE Conference Chairmen John  
Marquis Converse and Blair O Rogers 338 pages illustrated The  
New York Academy of Sciences New York N Y 1957 Price \$4 50

This volume deals with many facets of the homograft problem but places special emphasis on alteration of the normal host graft relationships. While the ultimate objective of the permanent survival of the homograft in the human still remains an elusive goal shrouded by the mysterious and incompletely understood sequence of events known as rejection nevertheless this volume contributes to further progress in this field. This is done in several ways: (1) Ingenious technical methods are described which have and will further facilitate investigation (2) experimental data presented shed further light on the problem (3) clinical application of some investigative results are pointed out (4) avenues for further investigative work are opened up

The many papers dealing with induction of tolerance not only in the embryo but also in the adult animal lead one to hope that this may eventually be applicable to the human. The fact that skin homografts in the human survive longer if taken from individuals closely related to the recipient and whose blood groups are the same is of importance to the clinician. The demonstration that bone marrow transplants in animals survive permanently in irradiated recipients holds great possibilities for victims of this atomic age if and when this technique is made possible in the human. This volume is recommended to all those interested in the homograft problem

—JOSEPH R. CONNELLY, Capt MC USN

**PRACTICAL GYNECOLOGY** by *Walter J. Reich M.D., J. A. C. S., F. I. C. S.*, and *Mitchell J. Nechou M.D., J. A. C. S., F. I. C. S.* 2d edition 648 pages 284 illustrations including 68 subjects in color J. B. Lippincott Co. Philadelphia, Pa., 1957 Price \$12.50

With special emphasis on office gynecology rather than upon highly specialized hospital procedures, this book admirably fulfills the needs of the general practitioner for whom it was principally designed. The subject material is presented in an unusually clear and concise manner. The "to the point" differential diagnosis of gynecologic symptoms and signs is refreshingly clear. While presenting an authoritative description of elementary and time tested methods, procedures, and treatments, full consideration is given to the newer concepts and current practices of gynecology. Each chapter is complete in its coverage of the basic subject material albeit repetitious insofar as the entire text is concerned. Placing the diagnosis and treatment of female disorders within the framework of medicine as a whole further adds to its usefulness by the general practitioner as well as the student or would be specialist.

Nine entirely new chapters have been added to this expanded second edition. There also is a new section on the diagnosis of early pregnancy, and considerable material has been incorporated in the chapter on examination of the breast. Although the chapter devoted to radiation therapy is presented in a most lucid manner, one cannot help wondering whether the authors have not overreached their goal by adding this discourse to a book devoted primarily to office type gynecologic practice. The reviewer would concede that this chapter is of extreme interest but doubts that the sketchy outline would be of any great value to a general practitioner. Current literature findings do not support the authors in their recommendation of therapeutic abortion in a patient who had previously been treated for carcinoma of the breast three years before by radical mastectomy. Eastman, Westberg, Thomas Taylor White, and the writings of others would indicate that the authors' opinion is on tenuous ground at the present time. Again, full discussion of such an important subject would be best omitted from this otherwise fine publication leaving this matter to more comprehensive major works. With the exception of these minor criticisms, this book is recommended as an authoritative reference source in the field of practical gynecology for use by the general practitioner, intern, and medical student.—EDWARD A. ZIMMERMANN Col. MC USA

**DeLee's OBSTETRICS FOR NURSES** by *M. Edward Davis M.D.*, and *Catherine E. Sheckler R.N., M.A.* with a Foreword by *Ann Kitchner* 16th edition 625 pages illustrated W. B. Saunders Co., Philadelphia, Pa., 1957 Price \$1.75

It is gratifying to note that the social and psychologic aspects of pregnancy have been pointed up, and special emphasis placed on pregnancy as a normal physiologic function. This new approach clearly demonstrates the increasingly important role the nurse is being called

upon to play and makes us realize that she must become better prepared to meet this new challenge

The hospital corpsmen who have read this text without any urging were very favorably impressed. They found it extremely interesting and easy to understand. A new interest in obstetrics seems to have been stimulated which will be encouraged since we have such a marked shortage of trained interested and properly motivated personnel to staff our obstetric units.

The illustrations are excellent throughout the book.

The inclusion of the father in the total picture with parents classes and the section on natural childbirth and rooming in emphasize again that this is a normal physiologic function not an illness and therefore is a family affair.

This book which was written primarily for student nurses is also highly recommended as a reference book for all graduate nurses especially those in the advanced clinical programs.

—CATHERINE J CRANE Lt. NC USN  
—MARCUS A GODINEZ Capt MC USN

OBSTETRICAL NURSING by Carolyn Conant Van Blarcom, R N Revised by Emma Ziegel R N B S 4th edition 855 pages illustrated The Macmillan Co New York N Y 1957 Price \$6.50

This new edition succeeds in meeting its objective "to present in a modern and comprehensive form the many recent advances in obstetrics and obstetric nursing." The format is excellent the illustrations are clear and accurate and the historical data well placed for easy reading. The book is well indexed has an excellent glossary and a good bibliography at the end of each chapter. The first half is devoted to anatomy physiology the development of the baby and birth. The chapters which follow are "The Nurse's Duties during Labor" and "Analgesia and Anesthesia." These are both approached in an up-to-the-minute manner. New drugs and types of anesthesia are carefully considered and the author has given space in pointing out advantages and disadvantages of each. One chapter is devoted to "Recent Trends in Maternity Care" and though brief it covers such programs as the emergency maternity and infant care program of the World Health Organization, midwifery and the development of complete maternity care. Part VII which presents "The Care of the Baby" is excellent. It explains in detail the normal and the premature as well as describing the latest methods in care and feeding.

This excellent textbook has been revised and almost completely rewritten hence it becomes one of the most up-to-date books for nurses during their clinical experience in obstetrics. The data presented is given in an understanding manner and should make learning an easy matter. It contains a wealth of new material and should be a valuable reference. It is recommended for the libraries of all schools of nursing.

—JOSEPHINE M GREEN Maj ANC USA

**MENTAL DEPRESSIONS AND THEIR TREATMENT** by Samuel Henry Kraines  
M D 355 pages illustrated The Macmillan Co., New York, N. Y.,  
1957 Price \$8

As far back as the records of man go, "mental depressions" have plagued the human race. Many explanations have been offered and numerous treatments suggested. When Saul, the first King of Israel, became depressed, the following explanation was given: "Now the Spirit of the Lord departed from Saul and an evil spirit from the Lord tormented him." The therapy was a form of recreation. "And whenever the evil spirit from God was upon Saul, David took the lyre and played it with his hand and Saul was refreshed and was well and the evil spirit departed from him." However, recreation as a therapy has not always been so effective. Still later the humoral theory of excessive black bile was offered and remained a popular one in centuries.

During the past 30 years the psychodynamic theory has been the most popular, and the psychoanalytical school of psychiatry the most articulate. It is refreshing to receive a book challenging the predominant concepts. However, one gets the impression from Dr. Kraines' concept that the manic-depressive depression is a result of disturbed physiologic function in the diencephalic area including the thalamus, the hypothalamus, the reticular system and the rhinencephalon is possibly overstressed that its frequent repetition does not necessarily make it true. Modern psychiatric literature certainly suggests that there is a need to call attention to the possibility that psychiatry is losing the somatopsychic approach to illness of the psyche, and this book emphasizes this approach in a very interesting, comprehensive, and effective manner.

The chapters on symptoms and diagnoses are most instructive. During the past five years spent largely at Air Force training bases, this reviewer has often felt uneasiness when "schizophrenia and reactive depression were such frequent diagnoses and very seldom challenged. Dr. Kraines has made one aware of the possibility that manic-depressive illness is still with us and has emphasized the need for considering differential diagnoses. His type of therapy seems particularly practical and should be useful in the military setting.

This book is recommended for military hospital libraries, and can be read with profit by the general medical officer as well as the specialist.—CHARLES H. WIGGINS Lt Col USAF (MC)

**LOCAL ANESTHESIA AND PAIN CONTROL IN DENTAL PRACTICE** by Leonard M. Monbetsm B S, M S D D S 299 pages, illustrated  
The C. V. Mosby Co. St. Louis Mo., 1957 Price \$8.75

This unique volume implements the author's belief that dental surgical procedures can and should be done with a complete absence of pain. It contains a wealth of information concerning not only local anesthesia and pain control but also such related subjects as sterilization procedures, office emergencies, a welcome extensive illustrated

review of trigeminal nerve anatomy and function and a chapter on the medicolegal aspects of office procedures

The various techniques of block field and infiltration are described clearly and concisely. The chemical pharmacologic and physiologic properties of each are so outlined as to permit considerable latitude in the choice of agents. Perhaps too much attention is given to the extraoral techniques of local anesthesia which apparently are but seldom used in dentistry. The author discusses the physiology of pain and its control indicating that postoperative pain is also the responsibility of the dentist. It is also his belief that painless procedures depend in great part on the patient's co-operation as influenced to a degree by his pain threshold. Of interest to dental anesthetists is the stress placed on preanesthetic medication for dental anesthesia. Considerable space is allocated to the advantages and disadvantages of various drugs. This is a field that it would seem many dentists overlook entirely. The chapter on complications and emergencies is excellent as a reference for the practicing dentist and for the student who has advanced enough to understand the terminology employed.

—ROBERT F. CORWIN Col USAF (MC)

Management of the Patient with HEADACHE by Perry S. MacNeal M D  
F A C P Bernard J. Alpers M D Sc D (Med.) F A C P and  
William R. O'Brien M D F A P A 145 pages Lea & Febiger  
Philadelphia Pa 1957 Price \$3.50

This book is a rather brief survey of the problem of headache but a number of important aspects of the subject have been omitted. A great deal of general and specific information may be gleaned from its 138 pages.

The first three chapters are devoted to mechanisms of head pain of organic, psychologic, and vascular origin respectively. The discussion of psychologic mechanisms did not strike this reviewer as being very rewarding, probably because of the inherent difficulties in presenting such material in abbreviated and simplified terms.

The major portion of the book is devoted to differential diagnosis and treatment of the various types of headache. The grouping is more or less arbitrary and a certain amount of overlapping results but this does not detract from the effectiveness of the presentation. Migraine is dealt with at considerable length and the discussion is an excellent one. In regard to the so-called "histamine cephalalgia" of Horton, the authors express the opinion that food allergy is the cause and that it can be successfully managed by the use of elimination diets. They acknowledge quite clearly however the difficulties involved in successful treatment along these lines.

An important asset of the book is its readability. It is written (for the most part) in a conversational style and is sufficiently light hearted at times to make this troublesome and rather fatiguing subject of headache a little easier to contemplate.

—HARVEY E. REITZ Capt MC USN





## New Books Received

Books received by the *U S Armed Forces Medical Journal* are acknowledged in this department. Those of greatest interest will be reviewed in a later issue.

- NEW RESEARCH TECHNIQUES OF NEUROANATOMY** A Symposium Sponsored by the *National Multiple Sclerosis Society* edited by William F. Bingle Ph D Sc D Foreword by Frederick L. Stone Ph D 98 pages illustrated Charles C. Thomas Publisher Springfield Ill 1957 Price \$4.75
- PEDIATRIC CLINICS OF NORTH AMERICA** August 1957 Symposium on Handicaps and Their Prevention Carl C. Fisher M D Consulting Editor 799 pages illustrated W. B. Saunders Co Philadelphia Pa 1957 Price \$15 per year of four books issued quarterly Sold only by a year of four consecutive numbers
- CURRENT SURGICAL MANAGEMENT** A Book of Alternative Viewpoints on Controversial Surgical Problems Editors John H. Mulholland M D Edwin H. Ellison M D Stanley R. Friesen M D with contributions by 76 American authorities 494 pages illustrated W. B. Saunders Co Philadelphia Pa 1957 Price \$10
- ONE SURGEON'S PRACTICE** by Frederick Christopher M D 151 pages W. B. Saunders Co Philadelphia Pa 1957 Price \$4.50
- PROGRESS IN GYNECOLOGY** Volume III, edited by Joe V. Meigs M D and Somers H. Sturgis M D 780 pages illustrated Grune & Stratton, Inc New York N Y 1957 Price \$15.50
- PRACTICAL NUTRITION** by Alice B. Peyton D S M S 410 pages illustrated J. B. Lippincott Co Philadelphia Pa 1957 Price \$5.60
- HISTOLOGY** by Arthur North Ham M B F R S C 3d edition 895 pages 382 figure numbers including 8 plates in color J. B. Lippincott Co Philadelphia Pa 1957 Price \$11
- A MANUAL OF STOMATOLOGY** by J. P. Halsey M B B S D D Sc (Melb) with a foreword by Sir Charles Herrus D S O O B E M D B D S D P H 130 pages illustrated N. M. Perger Limited Christchurch New Zealand 1957 Price \$5.40
- THE YEAR BOOK OF DERMATOLOGY AND SYPHILOLOGY** (1956 1957 Year Book Series) edited by Rudolph L. Baer M D and Victor H. Witten M D 464 pages illustrated The Year Book Publishers Inc, Chicago Ill 1957 Price \$7
- MEDICAL WRITING** The Technique and the Art by Morris Fishbein M D 3d edition The Blakiston Division McGraw-Hill Book Co Inc New York N Y 1957 Price \$7
- METHODOLOGY OF THE STUDY OF AGEING** Ciba Foundation Colloquia on Ageing Volume 3 Editors for the Ciba Foundation G. E. W. Wolstenholme O B E M A M B B Ch and Cecilia M. O'Connor B Sc 20 pages illustrated Little Brown and Co Boston Mass 1957 Price \$6.50



1560

U S ARMED FORCES MEDICAL JOURNAL (V 1 8 No 10)

THE PSYCHOLOGIC STUDY OF MAN Publisher by John Money Ph D 216 pages  
Charles C Thomas Springfield Ill 1957 Price \$4 75

HUMAN BLOOD COAGULATION and Its Disorders by Rosemary Biggs B  
Sc (Lond) Ph D (Toront) M D (Lond) and R G MacFarlane  
M A (Oxon) M D (Lond) F R S 2d edition 476 pages illus-  
trated Charles C Thomas Publisher Springfield Ill 1957 Price  
\$8 50

PNEUMOENCEPHALOGRAPHY by E Graeme Robertson M D (Melb)  
F R C P F R A C P 482 pages illustrated Charles C Thomas  
Publisher Springfield Ill 1957 Price \$14 50

THE MENTALLY ILL CHILD A Guide for Parents by Steven B Getz Ph  
D and Elizabeth Lodge Rees M D 68 pages Charles C Thomas  
Publisher Springfield Ill 1957 Price \$3 50

HYPOPHYSECTOMY edited by D H Pearson M D F A C P American  
Lecture Series Publication No 315 A Monograph in The Banquetstone  
Division of American Lectures on Tumors edited by David A Karnof  
sky M D 154 pages Charles C Thomas Publisher Springfield Ill  
1957 Price \$5

THE CLINICAL ASPECTS OF ARTERIOSCLEROSIS by Seymour H Rinzler  
M D F A C P 339 pages illustrated Charles C Thomas Pub-  
lisher Springfield Ill 1957 Price \$8 75

THE RIO GRANDE FLOOD A Comparative Study of Border Communities in  
Disaster by Roy A Clifford Disaster Study Number 7 NAS-NRC  
Publication No 458 145 pages 4 illustrations The Committee on  
Disaster Studies Division of Anthropology & Psychology The National  
Academy of Sciences-National Research Council Washington D C  
October 1956 Price \$2 50

AN INTRODUCTION TO METHODOLOGICAL PROBLEMS OF FIELD STUDIES  
IN DISASTERS by Lewis M Kilham Disaster Study Number 8 NAS  
NRC Publication No 465 35 pages Committee on Disaster Studies  
Division of Anthropology & Psychology The National Academy of  
Sciences National Research Council Washington D C December  
1956 Price \$0 75

CONVERGENCE BEHAVIOR IN DISASTERS A Problem in Social Control,  
by Charles E Fri and J H Matheson Disaster Study Number 9  
NAS-NRC Publication No 476 102 pages 13 plates Committee on  
Disaster Studies Division of Anthropology & Psychology The National  
Academy of Sciences-National Research Council Washington D C  
June 1957 Price \$2

OCCIPITOPOSTERIOR POSITIONS by Edward L King A B M D F A  
C S F A C O G American Lecture Series Publication No 310  
A Monograph in American Lectures in Gynecology and Obstetrics  
edited by E C Hamblen B S M D F A C S 106 pages illus-  
trated Charles C Thomas Publisher Springfield Ill 1957 Price  
\$3 75

ZINSSER BACTERIOLOGY by David T Smith M D Norman F Conant  
Ph D et al 11th edition 953 pages illustrated Appleton-Century-  
Crofts Inc New York N Y 1957

# UNITED STATES ARMED FORCES MEDICAL JOURNAL

*Published Monthly by  
the Armed Forces Medical Publication Agency  
Department of Defense*



*Editor*

CAPTAIN BENNETT F AVERI MC, USN

*Associate Editors*

COLONEL ROBERT S ANDERSON, MC, USA  
COLONEL ROBERT J BENFORD, USAF (MC)

*Assistant Editor*

LIEUTENANT ROBERT DRUYAN, MC, USNR

UNITED STATES  
GOVERNMENT PRINTING OFFICE  
WASHINGTON : 1957

# Monthly Message

## Military Medicine—its Mission

The medical services of our Armed Forces are authorized by law to afford medical coverage—both outpatient and inpatient—for various groups in addition to active duty personnel. In peace this phase of military medicine sometimes tends to obscure the primary mission, and it is this that I should like to examine briefly.

It seems to me that the primary mission of our military medical services may be defined under several headings:

- 1 Care of the sick and injured on active duty
- 2 Preventive medicine—to protect and safeguard the lives of active duty personnel and maintain them as best possible in a state of health and readiness
  - a Through preventive medicine and public health measures
  - b Research
  - c Industrial medicine
  - d Collecting information about diseases and public health problems of other countries
- 3 Maintenance of active programs for problems concerned with field medicine, aviation medicine and problems peculiar to naval medicine
- 4 Planning the best application of total resources within our manpower and economic potential and for the evacuation hospitalization care and rehabilitation of the sick and wounded in time of war. This entails
  - a Understanding of strategic and tactical concepts
  - b Knowledge of materiel workloads, risks and administration
  - c Active leadership and command in the field

In order to fulfill this mission it is essential that qualified members of the Medical Dental and Medical Service Corps attend the National War College, those of the services or the Industrial College of the Armed Forces or have had staff or command experience before assignment to higher position of such responsibility. This is necessary because the medical departments of the services are all integral parts of their respective services and in time of war must form one team with one aim. Therefore in time of peace this primary mission must never be obscured or dimmed by the purely professional aims and natural extension of patient care.

*Frank B. Berry*

FRANK B. BERRY  
Assistant Secretary of Defense  
(Health and Medical)

# Table of Contents

	Page
Man in a Space Vehicle— <i>Dan C. Ogle</i> .....	1561
Aeratitis Media and Aerisinitis in Submarine Trainees A Prophylactic Study— <i>John H. Schulte</i> .....	1571
Relation of Disability To Hypoxemia and Congestive Failure in Pulmonary Emphysema Analysis of 100 Cases— <i>James C. Syner</i> .....	1577
Jellyfish Stings and Their Medical Management— <i>Bruce W. Halstead</i> ..	1587
Icorus and the Physician Reflections on Aircraft Accidents and Their Prevention— <i>Frank B. Berry</i> .....	1603
A Technic for Military Delinquency Management I The Problem and the Program— <i>Bruce L. Bushard and Arnold W. Dahlgren</i> .....	1616
CLINICOPATHOLOGIC CONFERENCE	
U S Naval Hospital Coronado Colif .....	1632
SERVICE ARTICLES	
Are We Overlooking the Effects of Combat Experience in Some of Our Psychiatric Cases?— <i>Charles S. Mullin</i> .....	1648
A Modified Child Guidance Program in an Air Force Hospital— <i>Douglas Powers Sam Washington and Joe Lucero</i> .....	1653
Observations on the Dynamics of Leadership A Methodologic Approach— <i>Dennie L. Briggs and Irving D. Berg</i> .....	1658
CASE REPORTS	
Ovarian Abscess Complicating Pregnancy— <i>Robert C. Koehn</i> .....	1664
Bilateral Bell's Palsy Complicating Infectious Mononucleosis— <i>Hall G. Canter and William R. Schilhammer</i> .....	1670
Ganglioneuroma— <i>Richard C. Schultz and Philip J. Noel Jr.</i> ..	1676
Relation of Military Assignment to Choice of Conversion Symptoms— <i>Jean Lyle and Joseph Berchmans Rioux</i> .....	1686
DEPARTMENTS	
A Message From the A. M. A. ....	1691
Medical Officers of 16 Countries Given Graduate Course by Navy ..	1693
Admiral Hogan Visits U S S Seawolf .....	1694
General Heaton Honored by Brazilian Officers in Walter Reed Ceremony	1695
Official Decorations .....	1696
Deaths .....	1696
Officers Certified by Specialty Boards .....	1697

# Monthly Message

## Military Medicine—Its Mission

The medical services of our Armed Forces are authorized by law to afford medical coverage—both outpatient and inpatient—for various groups in addition to active duty personnel. In peace this phase of military medicine sometimes tends to obscure the primary mission, and it is this that I should like to examine briefly.

It seems to me that the primary mission of our military medical services may be defined under several headings:

- 1 Care of the sick and injured on active duty
- 2 Preventive medicine—to protect and safeguard the lives of active duty personnel and maintain them as best possible in a state of health and readiness
  - a Through preventive medicine and public health measures
  - b Research
  - c Industrial medicine
  - d Collecting information about diseases and public health problems of other countries
- 3 Maintenance of active programs for problems concerned with field medicine, aviation medicine and problems peculiar to naval medicine
- 4 Planning the best application of total resources within our manpower and economic potential and for the evacuation hospitalization care and rehabilitation of the sick and wounded in time of war. This entails
  - a Understanding of strategic and tactical concepts
  - b Knowledge of materiel workloads, risks and administration
  - c Active leadership and command in the field

In order to fulfill this mission it is essential that qualified members of the Medical Dental and Medical Service Corps attend the National War College, those of the services or the Industrial College of the Armed Forces or have had staff or command experience before assignment to higher position of such responsibility. This is necessary because the medical departments of the services are all integral parts of their respective services and in time of war must form one team with one aim. Therefore in time of peace this primary mission must never be obscured or dimmed by the purely professional aims and natural extension of patient care.

*Frank B. Berry*

FRANK B. BERRY  
Assistant Secretary of Defense  
(Health and Medical)

# Table of Contents

	Page
Man in a Space Vehicle— <i>Dan C. Ogle</i> .....	1561
Aeratitis Media and Aerosinusitis in Submarine Trainees: A Prophylactic Study— <i>John H. Schulte</i> .....	1571
Relation of Disability To Hypoxemia and Congestive Failure in Pulmonary Emphysema: Analysis of 100 Cases— <i>James C. Syner</i> .....	1577
Jellyfish Stings and Their Medical Management— <i>Bruce W. Halstead</i> .....	1587
Icarus and the Physician: Reflections on Aircraft Accidents and Their Prevention— <i>Frank B. Derry</i> .....	1603
A Technique for Military Delinquency Management: I. The Problem and the Program— <i>Bruce L. Bushard and Arnold W. Dahlgren</i> .....	1616
CLINICOPATHOLOGIC CONFERENCE	
U S Naval Hospital, Corona Calif. ....	1632
SERVICE ARTICLES	
Are We Overlooking the Effects of Combat Experience in Some of Our Psychiatric Cases?— <i>Charles S. Vulliamy</i> .....	1648
A Modified Child Guidance Program in an Air Force Hospital— <i>Douglas Powers, Sam Washington, and Joe Lucero</i> .....	1653
Observations on the Dynamics of Leadership: A Methodologic Approach— <i>Dennis L. Briggs and Irving D. Berg</i> .....	1658
CASE REPORTS	
Ovarian Abscess Complicating Pregnancy— <i>Robert C. Korch</i> .....	1664
Bilateral Bell's Palsy Complicating Infectious Mononucleosis— <i>Hall G. Canter and William R. Schillhammer</i> .....	1670
Ganglioneuroma— <i>Richard C. Schultz and Philip J. Noel Jr.</i> .....	1676
Relation of Military Assignment to Choice of Conversion Symptoms— <i>Jean Lyle and Joseph Berchmans Rioux</i> .....	1686
DEPARTMENTS	
A Message From the A. M. A. ....	1691
Medical Officers of 16 Countries Given Graduate Course by Navy.....	1693
Admiral Hagan Visits U S S Seawolf.....	1694
General Heaton Honored by Brazilian Officers in Walter Reed Ceremony	1695
Official Decorations.....	1696
Deaths.....	1696
Officers Certified by Specialty Boards.....	1697



## TABLE OF CONTENTS—Continued

## DEPARTMENTS—Continued

Correspondence.....	1698
---------------------	------

## BOOKS

Reviews of Recent Books.....	1699
New Books Received.....	1715

## Foreword

The United States Armed Forces Medical Journal is the medium for disseminating information of administrative and professional interest to all medical personnel of the Department of Defense. The Assistant Secretary of Defense (Health and Medical) and the Surgeon General of the several services invite all medical officers and officers of the Medical Service Corps, Nurse Corps officers and officers of the Veterinary Corps of the Armed Forces and the medical consultants of the Army, Navy and Air Force to submit manuscripts for publication in this Journal.

FRANK B BERRY M D  
Assistant Secretary of Defense (Health and Medical)

MAJOR GENERAL SILAS B HAYS  
Surgeon General United States Army

REAR ADMIRAL BARTHOLOMEW W HOGAN  
Surgeon General United States Navy

MAJOR GENERAL DAN C OGLE  
Surgeon General United States Air Force

# UNITED STATES ARMED FORCES MEDICAL JOURNAL

Volume VIII

November 1957

Number 11

## MAN IN A SPACE VEHICLE

DAN C. OGLE *Major General USAF (MC)*

SCIENTIFIC REALITY today stimulates our imagination as did the fiction of Jules Verne in the last century. This author of sensational pseudoscientific romances of adventure wrote of fantastic technological developments and inventions, many of which have subsequently become realities. Our wonder was indeed stimulated by "Five Weeks in a Balloon," "Twenty Thousand Leagues Under the Sea," "A Trip to the Moon," "Around the World in Eighty Days," and "Hector Servados," one of his lesser known books which described life on a comet. Science is moving so rapidly that it is difficult to distinguish between reality and science fiction. I have heard reliable scientists say that we can do anything we really want to do.

Recently at a research conference in my office, Colonel John Paul Stapp reminded us that people in high places were continuing to write obituaries for space flight, yet the idea refuses to stay dead. For example, the Washington *Evening Star* of April 24, 1957<sup>1</sup> carried the announcement that fabrication had started on the X 15, a rocket powered research plane expected to fly higher and faster than any other manned aircraft, and that Pentagon officials had let it be known that the new craft may reach a speed of 4,000 miles an hour and fly as high as 200,000 feet. In my opinion, that is space flight. Since then there have been hints of an X 30, the nature of which I have no idea. Some conceive spaces outside our atmosphere, and others as beyond the earth's gravitational pull. Being interested in the human factors involved, I

Presented on 16 May 1957 in Birmingham Ala. at a symposium on "The Age of Space" sponsored by the Southern Research Institute. General Ogle is Surgeon General of the Air Force.

Reprinted from the U. S. Air Force Medical Service Digest 8-28 Sept. 1957

15/1

think of space flight as that which requires the traveler to take his environmental needs with him in a sealed cabin or capsule I could actually stretch my definition to include lower levels

Doctor Edward Teller<sup>1</sup> in an article entitled "Science in the United States" appearing in the *Air Force* magazine for April 1957 expressed himself as follows "I am talking about space travel about going to the moon Why should we? I haven't found a good practical reason I haven't found a good military reason I don't know how good and practical Columbus reasons were In the end something practical came of them" Doctor Teller goes on to discuss our interest in the unknown and unexplored which is the mainspring and justification of all adventures and expresses his personal concern that unless we expand our own scientific interests and capabilities the first close up pictures of the moon will be brought back by other than Americans

In recent publicity releases an aircraft corporation makes no apology for such statements as "Space travel, a dream five years ago is now so near reality that lunar landings are predicted by the end of this century With the possibility of interplanetary flight accepted by engineers man now looks to get him there is speculating on new power sources needed to get him there A predicted break through is the plasma engine which will harness ions or light itself to drive aircraft nearly 166 000 miles per second "I must admit here that I have never heard of such a predicted break through or of a "plasma engine" but the term did forcefully bring to my mind that the "plasma engine" with which have some familiarity—man himself—continues to be much the same old model having enjoyed no engineering improvements since generations before the dawn of history If space travel is to proceed much beyond that which is accomplished by air vehicles already in operation then much must be done to select train and sustain the human "plasma engine" in four dimensional environments that are becoming increasingly harassing and complex

We have not yet scratched the surface of human reaction to the fourth dimension of time as a factor in extraterrestrial environments Adapting people to this air age is still in its infancy Even yet we encounter people who doubt that the simple aircraft is here to stay We in the Air Force receive frequent complaints from people who resent aircraft noise and the occasional sonic boom is being accused of every type of destruction from impotency of minks to fractured dental plates

Publicly accepted or not, a rocket powered manned aircraft is reported to have flown approximately 2 000 miles per hour reaching an altitude nearly 24 miles I repeat that by my own definition that was space flight Within the next five years jet-powered air-

craft will be operating routinely as high as 16 miles at speeds around Mach 3. If not at this point, then shortly beyond lies the province of space, at these borders man needs much the same physical or environmental support as he requires in true space. Vehicles powered by rocket engines need no air either for lift or to burn their fuels, yet man's sensible atmosphere must accompany him wherever he goes, whether at altitudes of 16 miles or on a two year round trip to Venus—our closest neighboring planet.

### ACCLIMATIZATION TO SPACE

With this introduction I have attempted to establish the point that from the interests of aviation medicine and human engineering, space flight is now upon us, for earth bound man requires special medical and physiologic support almost from the time he leaves the ground. Properly selected and trained, he can fly well in an open cockpit up to an altitude of 10,000 feet. Breathing 100 per cent oxygen, he can go to between 30 and 40 thousand feet, but at these levels he needs added protection from decreased barometric pressure and from falling temperatures. Beyond this, oxygen must be supplied under pressure by mask, or by cabin or suit pressurization. No cabin pressurization system is foreseen that would carry the occupant of an air vehicle beyond 70,000 feet, as at this point the bulk of the equipment required to compress the thin air and the heat generated thereby are of such magnitude that a sealed cabin or capsule is mandatory.

Several years ago Major General Harry G. Armstrong,<sup>4</sup> in starting a space medicine department at the U. S. Air Force School of Aviation Medicine, called attention to successful animal carrying rocket flights and remarked that space medicine studies were indicated because, as he expressed it, "If monkeys can do it, we can learn to do it."

Many now scientific processes of recent years have forged interlocking bonds between medical science and engineering. Space medicine is linked with several scientific disciplines dealing with extraterrestrial matters. Recently some educators have gone so far as to recommend engineering as a prerequisite to the study of medicine, and earlier this month Doctor Harvey E. Savely<sup>5</sup> of the U. S. Air Force Office of Scientific Research, in a special report to the Aero Medical Association in Denver, called attention to various technologies and disciplines required for research in aviation physiology. In summary, his paper stated that advances in aircraft design are making less critical the traditional physiologic problems in environmental protection. They will always be a challenge, of course, however, he emphasized new environmental factors presented by radiation and unusual patterns of acceleration. New demands are being made on man's endurance and performance under a wide variety of complex situations. We are becoming

increasingly dependent on the applied aspects of medical or physiological dynamics psychology and physiology often referred to as human engineering. These applications indicate that research in aviation physiology will be characterized by increasing emphasis on the central nervous system and on the biochemical and biophysical aspects that have a regulatory influence on human health and effectiveness. The fundamental biological mechanisms underlying human behavior and performance demand great consideration in any circumstance of space flight.

It is vague in any scientific or research atmosphere to announce that we stand on the threshold of a great "break through." Any speaker who omits his break through routine is not up on current custom.

In any event the human body and mind are now revealing secrets hitherto believed as ephemeral as thought itself. The psychiatrists are at one with the biochemists and previously unknown enzymes and toxins are becoming the substance of psychoses or sanity. Various steroids, hormones and other biochemical substances may be valuable indicators of latent stability, resistance, anxiety, heroism or fear. Human chemistry may determine our susceptibility to collapse or disease and the electrophysical properties of the skin may tell the scientists our capacity for continuing awareness. The electrowaves of brain activity may act as a radar to warn of approaching impacts on the psyche.

These are human areas that must be more fully researched before we can select and fit candidates to withstand the traumatic influences of prolonged space living.

### HAZARDS OF UPPER ATMOSPHERE

To better understand the environmental hazards of space flight it is appropriate to discuss the characteristics of the upper atmosphere and space, the nature of feasible space vehicles, the forces and fuels required for such travel and the element of time as it relates to human tolerance and survival. The biophysical considerations imposed by the four areas just mentioned are very challenging. It is necessary that whatever is needed by man to adequately sustain him for the entire duration of any contemplated flight including air, water, food and recreation must be complete within the sealed capsule of the vehicle. In addition to a constant supply of these necessities, all waste materials must be eliminated or converted for re-use. If this capsule can be made efficient then the absence of ambient air *per se* does not pose a problem from the respiratory standpoint.

The engine of the machine itself may produce heat or radiation and certainly will result in accelerative and decelerative forces traumatic in nature at the start and at the termination of rocket

flights into space. But perhaps we will find that the most traumatic factor of all is that of time and confinement within a sealed cabin, traveling in a lonesome void. Even today in prolonged flight at present operational altitudes, we are encountering by-products of isolated monotony which Clark and Graybiel<sup>6</sup> of the U. S. Naval School of Aviation Medicine, Pensacola, Fla., describe as the "break off phenomenon" or a feeling of separation from the earth.

In addition to the break off phenomenon, we occasionally hear of vague yet disturbing and possibly fatal episodes of fascination or hypnotic reactions resulting from target or instrument concentration. Similar popular explanations are given as reasons for the occasional disappearance of skin divers, men in another environment foreign to normal human experience.

Woodburn Heron<sup>7</sup> in an article, "The Pathology of Boredom," said that "the problem of human behavior in monotonous situations is becoming acute." He was speaking of increasing automation—or dial watching. Heron reported a series of experiments and concluded that "normal functioning of the brain depends on a continuing aroused reaction (incident to) constant sensory bombardment." However, sensory stimuli rapidly lose their power to arouse if they are restricted to the monotonously repeated stimulation of an unchanging environment or circumstance. A quote from a concluding paragraph is as follows: "Prolonged exposure to a monotonous environment, then, has definitely deleterious effects. The individual's thinking is impaired, he shows childish emotional responses, his visual perception becomes disturbed, he suffers from hallucinations, his brain wave pattern changes."

The earth is surrounded by a sea of compressible air, 99 per cent of which lies within 20 miles above the earth's surface. We can readily see then that for practical purposes as far as oxygen is concerned, space is relatively near the earth. As we ascend to altitude and barometric pressure is decreased, the partial pressure of oxygen (and hence that available to us) is correspondingly decreased. At 18,000 feet the barometric pressure and partial pressure of oxygen are one half that found at sea level, at 33,000 feet, one fourth, at 38,000 feet, one fifth, at 50,000 feet, one ninth, and at 100,000 feet, one ninety fifth. These data emphasize the requirement for a sealed self-contained and self-sufficient cabin for human flight, now possible in aircraft type of "spaceships" already in being.

The layer of atmosphere adjacent to the earth is called the troposphere. Its thickness varies with latitude and seasons but averages about 35,000 feet. Within the troposphere lies more than 75 per cent of the atmospheric bulk and almost all of the storms and weather. Electromagnetic storms, however, are generated by

sun activity resulting in unusual ionie bombardment of our atmosphere. Electromagnetic radiation with energy sufficient to light up the northern lights to interfere with radio transmission and reception and to increase the earth's background of cosmic radiation is frequently reported. Such "storms" may present problems in space. At 60 000 feet protection from cosmic rays and ultraviolet radiation by the atmosphere begins to diminish. There has been much speculation concerning the hazard from cosmic rays and early fears seem to have been exaggerated. However, the final word on this has not yet been spoken.

The effects of cosmic radiation are now being studied at Holloman Air Force Base, New Mexico, where mice are being sent to extreme altitudes and observed for biological effects. Except for the possible effects of violent electromagnetic storms, data on which are incomplete, we are not exposed to significant primary cosmic radiation below 60 000 feet because of the protection afforded by the atmosphere. Secondary lower voltage rays do reach us at all levels but are believed to be relatively harmless. Some believe that protection against cosmic radiation similar to that afforded by the atmosphere can be taken over by a cabin's hull in space flight. On this point I cannot argue. Once the exact medical hazard is determined, protection should be a function of the engineer. Doctor Herman J. Schaefer of the U S Naval School of Aviation Medicine, an authority on cosmic radiation, warns that commercial airlines should not risk flight above 90 000 feet as it has not been proved that mutations or malformations following such flights were not caused by cosmic radiation.

During the winter 1953-1954 an aluminum covered film pack was struck by some strange particle from outer space during a research balloon test at 100 000 feet—the space particle went through the film pack like a bullet through a deck of cards. In doing so it produced a scientifically thrilling sequence of what appeared to be the conversion of earthly matter into energy and then a reconversion of this energy into another form of earthly matter. Such reports give us pause in contemplating space flight.—I'm sure a mutation fearing "ag" would spell pause with a "W."

At an altitude of 75 miles the atmosphere no longer has a protective function against meteorites. Although in space flight the probability of collision with meteorites is remote, some thought must be given to protection against them. Meteorite bumpers or meteor screens consisting of an outer layer of steel around the hull of spaceships have been suggested. Perhaps of more concern is the build up or accumulation of energy by a fast traveling spaceship. Doctor Heinz Haber, an astrophysicist, stated that at one twentieth the speed of light in space the

energy equivalent striking the ship would be as if  
suns, causing immediate vaporization. It must be pre-  
that somewhere far below such speeds there is an ac-  
cumulation barrier. I am not one to say that barriers can  
surpassed.

Also, at this altitude the scattering of visible light by the  
and molecules ceases. This brings about the so-called "blue"  
or twilight of space with the stars visible at all times, yet  
objects in sunlight dazzlingly bright against the blackness  
shade. At 75 miles the transfer of sound by the atmosphere  
ceases, thereby producing the quietness of space. These  
serve to emphasize the psychological break-off phenomenon previously  
mentioned.

### IMMINENCE OF ROCKET FLIGHT

Planetary space flight may not be a reality until some time  
in the distant future. However, rocket flight involving space  
travel from one point of the earth to the other is just around the  
corner. The Secretary of the Army<sup>10</sup> recently predicted the use  
of rockets as troop transports whereby soldiers could be quickly  
and silently dropped into enemy territory. Many of the problems  
involved in interplanetary travel will be involved in rocket travel  
from one point on the earth to another. The rocket will be shot  
from the earth by a short burst of propulsion with high G force  
acceleration and will coast in an elliptical course after power  
has been shut off. It will then glide to a point of descent.  
Such flights at altitudes of 100 miles or more and speed up to  
15 times that of sound are envisioned. In such flights, the  
problems involved in prolonged space flight will be encountered.

In the stratosphere, flight at great speeds produces  
amounts of heat because of the transfer of heat from air to  
to the skin of the aircraft. This heat effect has been called the  
"thermal barrier." Control of this heat is an engineering problem.  
However, at an altitude of 120 miles above the earth's surface  
the air is too thin to cause frictional heat effects at any speed.  
Therefore, above 120 miles the temperature of the cabin's hull  
is governed by the sun's radiation.

Accelerations or G forces occur in all flights during such  
maneuvers as pull out from dives or in turns. When a person is  
accelerating in the direction from his feet to his head, the forces  
of inertia act in the opposite direction, this is called positive  
G. When a person is accelerating forward and the forces of  
inertia are backward, it is negative G. Positive G forces tend  
to cause blackout, negative G forces, redout. In present day,  
high performance flying by the use of G suits and restraining  
devices, man has been able to withstand forces within the struc-  
tural limits of his aircraft. It may be a different story in the fu-  
ture.



sun activity resulting in unusual ionic bombardment of our atmosphere. Electromagnetic radiation with energy sufficient to light up the northern lights to interfere with radio transmission and reception, and to increase the earth's background of cosmic radiation is frequently reported. Such "storms" may present problems in space. At 60 000 feet protection from cosmic rays and ultraviolet radiation by the atmosphere begins to diminish. There has been much speculation concerning the hazard from cosmic rays and early fears seem to have been exaggerated. However, the final word on this has not yet been spoken.

The effects of cosmic radiation are now being studied at Holloman Air Force Base, New Mexico, where mice are being sent to extreme altitudes and observed for biological effects. Except for the possible effects of violent electromagnetic storms, data on which are incomplete, we are not exposed to significant primary cosmic radiation below 60 000 feet because of the protection afforded by the atmosphere. Secondary, lower voltage rays do reach us at all levels but are believed to be relatively harmless. Some believe that protection against cosmic radiation by a cabin's hull in space flight on this point I cannot argue similar to that afforded by the atmosphere can be taken over. Once the exact medical hazard is determined, protection will be a function of the engineer. Doctor Hermann J. Schaefer of the U S Naval School of Aviation Medicine, an authority on cosmic radiation, warns that commercial airlines should not risk flight above 90 000 feet as it has not been proved that mutations or malformations following such flights were not caused by cosmic radiation.

During the winter 1953-1954 an aluminum covered film pack was struck by some strange particle from outer space during a research balloon test at 100 000 feet—the space particle went through the film pack like a bullet through a deck of cards. In doing so it produced a scientifically thrilling sequence of what appeared to be the conversion of earthy matter into energy and then a reconversion of this energy into another form of earthy matter. Such reports give us pause in contemplating space flight—I'm sure a mutation fearing wag would spell pause with a "H."

At an altitude of 75 miles the atmosphere no longer has a protective function against meteorites. Although in space flight the probability of collision with meteorites is remote, some thought must be given to protection against them. Meteorite bumpers or meteor screens consisting of an outer layer of steel around the hull of spacecrafts have been suggested. Perhaps of more concern is the build up or accumulation of energy by a fast traveling spacecraft. Doctor Heinz Haber, an astrophysicist, stated that at one twentieth the speed of light in space the

ies concerning the use of plants for photosynthesis, oxygen production, and carbon dioxide removal in a closed system. So far in these studies carried on at the University of Texas, it has been found that about 23 kilograms of a certain green alga the *Chlorella pyrenoidosa*, are sufficient to balance the gas metabolism of one man. Such a photosynthetic gas exchanger may one day be useful. For instance, in manned satellites, possibly artificial photosynthesis may be achieved.

Experiments must be continued concerning the maintenance of a livable environment in a sealed cabin. Perhaps the exploration of other methods of supplying oxygen and removing carbon dioxide, and the reconversion of waste solids and fluids to a usable state, is the answer.

### NEW SELECTION METHODS LIKELY

You will recall that I have previously stated that there has been little change in the model or general equipment of human beings for thousands of years. I can say, however, that modern medicine is learning much more about ourselves and that progress made in the past few years is comparable to the break-throughs in other scientific areas. We are learning more of the mechanisms of the central nervous system, both in the electrophysical aspects and in the biochemical areas, and it may be that with this increased knowledge of the physics and chemistry of our central nervous system, of our endocrine system, and of our very emotional content, we will develop much better techniques and processes for the selection, adaptation, and maintenance of people who will some day be called upon to man spaceships. Such a person must be all that the best aviator is today as well as being constitutionally and emotionally suited for the physical and emotional traumatic influences of sealed cabins speeding, heaven knows where, through the awful silence of a timeless and a darkened sky.

I could remain entirely within the realm of reality by predicting that we may in the near future be able to select and adapt human beings for specialized environmental circumstances by blood studies and adjustments of various steroids, hormones, and enzymes, by urine studies to determine adrenal gland activity, by galvanic sensitivity tests of the skin to determine the threshold of central nervous system awareness, by determination and adjustment of metabolic processes, and by brain studies through selected area electroencephalography.

There is so much that we have just begun to learn or even suspect—so much we must know about ourselves as human beings, and human souls—before we can leave our mother earth a length of time and have hope of return. I think of travel beyond our own little world, I

rockets However it is calculated that we could tolerate the G forces of attaining a speed of 25 000 miles per hour in 8 minutes It takes such speed to break away from the earth's gravity into true space

In horizontal flight under the pull of the earth's gravity the airplane follows a curved line parallel to the curvature of the earth In higher supersonic speed ranges, centrifugal forces begin to counteract the earth's gravitational forces bringing on the phenomenon of decreased weight or subgravity At 18 000 miles per hour or 5 miles per second, a state of zero gravity is reached In other words the pull away from the earth exactly equals the pull of gravity toward the earth At a speed of 7 miles per second an object will break away from the gravitational control of the earth and an "escape velocity" will exist At the present time the state of zero gravity can be obtained in jet planes flying a parabolic arc for only one-half minute and in rockets for three or four minutes

Experiments concerning the psychological effects of weightlessness are being studied at the Air Force School of Aviation Medicine and have been studied at the Aero Medical Laboratory and the Aero Medical Field Laboratory Studies indicate that by adaption the effects of zero gravity may be overcome at least, by some people Various subjective symptoms have been reported during the weightless state Some have felt exhilarated others have become peculiarly uncomfortable some have become violently nauseated The subjective sensation of falling is produced, like going over the top of a roller coaster This is due to the disturbances of ordinary impulses which depend on the pull of gravity It is quite likely that man will be able to adjust to a prolonged state of weightlessness both psychologically and physiologically regarding muscle and position control However it is too early to say whether or not serious medical problems might not result The space vehicle designers say they can create required gravity by spinning the ship Time can only tell whether or not this will help or become our ever so great grandchildren's substitute for "sit down you are rocking the boat"

Sustained flight above 70 000 feet is only possible when man carries his own atmosphere in a hermetically sealed cabin This raises the interesting question of providing a closed ecological system in which man can live In a sealed cabin he needs oxygen to breathe and wastes as well as excess carbon dioxide and other body gases and wastes as excess water vapor The "climatization" of such a sealed cabin is one of the problems of today The School of Aviation Medicine has a sealed cabin simulator which now serves as a research tool and will later serve for indoctrination The possibility of future flights of a week or a month's duration has prompted the sponsorship of stud

ies concerning the use of plants for photosynthesis, oxygen production, and carbon dioxide removal in a closed system. So far, in these studies carried on at the University of Texas, it has been found that about 2.3 kilograms of a certain green alga, the *Chlorella pyrenoidosa*, are sufficient to balance the gas metabolism of one man. Such a photosynthetic gas exchanger may one day be useful. For instance, in manned satellites, possibly artificial photosynthesis may be achieved.

Experiments must be continued concerning the maintenance of a livable environment in a sealed cabin. Perhaps the exploration of other methods of supplying oxygen and removing carbon dioxide, and the reconversion of waste solids and fluids to a usable state, is the answer.

#### NEW SELECTION METHODS LIKELY

You will recall that I have previously stated that there has been little change in the model or general equipment of human beings for thousands of years. I can say, however, that modern medicine is learning much more about ourselves and that progress made in the past few years is comparable to the breakthroughs in other scientific areas. We are learning more of the mechanisms of the central nervous system, both in the electrophysical aspects and in the biochemical areas, and it may be that with this increased knowledge of the physics and chemistry of our central nervous system, of our endocrine system, and of our very emotional content, we will develop much better techniques and processes for the selection, adaptation, and maintenance of people who will some day be called upon to man spaceships. Such a person must be all that the best aviator is today as well as being constitutionally and emotionally suited for the physical and emotional traumatic influences of sealed cabins speeding, heaven knows where, through the awful silence of a timeless and a darkened sky.

I could remain entirely within the realm of reality by predicting that we may in the near future be able to select and adapt human beings for specialized environmental circumstances by blood studies and adjustments of various steroids, hormones, and enzymes, by urine studies to determine adrenal gland activity, by galvanic sensitivity tests of the skin to determine the threshold of central nervous system awareness, by determination and adjustment of metabolic processes, and by brain studies through selected area electroencephalography.

There is so much that we have just begun to learn or even suspect—so much we must know about ourselves as human beings and human souls—before we can leave our mother earth for any length of time and have hope of returning. When I think of space travel beyond our own little world, I am reminded of a line from

my favorite spiritual—"Everybody talkin' bout Heaven ain't gwain there"

# REFERENCES

- 1 Fastest rocket plane work is under way Evening Star Washington D. C. Apr 24 1957 p A 2 columns 7 and 8
- 2 Teller E Science in the United States Air Force 4 102 104 107 Apr 1957
- 3 Douglas Aircraft Corporation The First Men on the Moon (advertisement) Air Force 4 64-65 Apr 1957
- 4 Armstrong H G Cited in Lipscomb F E Military hygiene in transition Pub Health 68 97 101 Apr 1955
- 5 Savely H E and Henry J P New look at aviation physiology J Aviation Med 28 121 126 Apr 1957
- 6 Clark B and Graybiel A Break-off phenomenon feeling of separation from earth experienced by pilots at high altitudes J Aviation Med 28 121 126 Apr 1957
- 7 Heron " Pathology of boredom Scientific American 196 52 56 Jan 1957
- 8 Schaefer H J Biologic effects of cosmic radiation in the C. S. and B. nson O. O. Jr (editors) Physics and Medicine of the Upper Atmosphere A Study of the Aeropause University of New Mexico Press Albuquerque New Mexico 1952 pp 290-315
- 9 Haber H The astrophysicist's views on Space Travel A Symposium J Aviation Med 28 121 126 Apr 1957
- 10 Brucker T M Cited in Varden J M Shape of future conflicts is sketched by Gavin Teller at Army conference Army-Navy-Air Force Register 77 1 Nov 3 1956

## USE OF UROPEPSINOGEN DETERMINATION

"Determination of the concentration of pepsinogen in the urine can be technically practical and clinically useful. It may offer a better index of gastric peptic activity than does incubation and it has been useful in the differential diagnosis of peptic ulcer versus gastric carcinoma. Uropepsinogen values can aid in locating the site of hematemesis and can assist in the diagnosis of pernicious anemia. The response of uropepsinogen to hormone stimulation may provide many diagnostic as well as therapeutic indexes to endocrinological conditions.

—WILLIAM P. PEAK, M.D.  
ELLEN MAE VIERGIVER, Ph.D.  
EDWARD J. VAN LOON, Ph.D.  
and GARFIELD G. DUNCAN, M.D.  
in Journal of American Medical Association p 1441 Dec 15 1956

# AEROTITIS MEDIA AND AEROSINUSITIS IN SUBMARINE TRAINEES

## A Prophylactic Study

JOHN H. SCHULTE *Lieutenant Commander MC USN*

**A**EROTITIS media and aerosinusitis are clinical entities that result from failure to equalize the pressure in the middle ear cavities and sinuses to that of an increasing or decreasing ambient atmospheric pressure. Armstrong<sup>1</sup> stated that aerotitis occurs when there is inadequate ventilation of the middle ear cavity during ascent or descent.

Barotrauma of the middle ear occurs less commonly from exposure to a decreasing atmospheric pressure. This is due to the movement of the eilia and the flutter valve action of the ostium of the Eustachian tube, which favor the flow of air from the tympanic cavity to the nasopharynx and oppose movement in the opposite direction. Swallowing, yawning, and similar physiologic actions open the ostium of the Eustachian tube, permitting the passage of small volumes of air. In a decreasing atmospheric pressure (ascent), there is little to hinder air flow from the middle ear to the nasopharynx.

When the atmospheric pressure is increasing, the pressure in the nasopharynx tends to hold the Eustachian tube closed. This makes it necessary to use forced swallowing, yawning, or the Valsalva maneuver to produce equilibrium in the middle ear cavity.

Any acute or chronic disease that produces edema or congestion of the mucosa or lymphoid tissue in the vicinity of the ostium of the Eustachian tube, makes equalization more difficult or even impossible. The effect of barometric pressure changes on the middle ear and sinuses may range from a minor hyperemia to serious pathologic changes with effusion, hemorrhage, suppuration, and rupture of the ear drum.

Teed<sup>2</sup> developed a system of grading the degree of damage to the ear as determined by otoscopic examination. In grade I aro-

---

From U. S. Naval Medical Research Laboratory, Submarine Base, New London. Conn. Comdr. Schulte is now assigned to Pittsburgh Area Branch Office, U. S. Atomic Energy Commission, P. O. Box 423, Idaho Falls, Idaho.

titis media there is retraction of the tympanic membrane with peripheral blood vessel congestion. Grado II shows retraction of the drum with generalized redness in all quadrants. In grade III there is transudation of serum into the middle ear cavity, giving the drum a yellowish appearance. Grado IV shows hemorrhage into the middle ear cavity with or without rupture of the tympanic membrane. The middle ear drum may be filled completely with blood making the ear drum appear black.

Grado I aerotitis media causes pain and transient muffling of sound without loss of auditory acuity. The symptoms last 12 to 24 hours. Nose drops containing a vasoconstrictor will help to relieve the pain.

Patients with grado II aerotitis media complain of severe pain and some loss of hearing. Catheterization of the Eustachian tube may correct the drum retraction but does not reduce the pain or redness. Complete recovery with return of normal auditory acuity usually occurs in 24 to 48 hours.

A grado III aerotitis media causes pain, a feeling of fullness in the ears, loss of hearing and tinnitus. Inflation of the Eustachian tube and daily shrinkage of the tubal mucosa is the recommended treatment. Recovery usually occurs in three to five days. If the fluid is not absorbed within a week, some authors recommend myringotomy and suction.

Patients with a grado IV aerotitis media may have no pain whatsoever. A feeling of fullness in the ears, tinnitus, and a definite loss of hearing are the symptoms commonly noted. Auditory acuity is recovered in five to ten days, however, permanent partial deafness may occasionally result. When rupture of the tympanic membrane occurs it usually will heal completely in two to five days if infection does not supervene.

Shilling\* found that 27.5 per cent and 30 per cent of two groups of 558 and 708 otherwise healthy young men had difficulty leading to aerotitis media when subjected to increased atmospheric pressure. These men had been screened carefully for submarine service to eliminate those with a history of severe or chronic upper respiratory infections, ear disease, asthma, hay fever, and other related allergies. Presumably an even greater percentage of the general population would be so affected by atmospheric pressure changes, thus limiting them to some degree or precluding them completely from occupations involving commercial air travel, mining, commercial diving, and tunnel (caisson) work as well as hobbies such as amateur flying, skin diving, and spear fishing.

The effect on the military service is to limit the number of otherwise healthy men who can qualify for aviation submarine

service, deep-sea diving and salvago, and underwater demolition teams. Additionally, aerotitis media or arosinusitis may temporarily incapacitate men who are qualified in these military specialties. For this reason, a study was undertaken to evaluate the prophylactic effect of several different topical drugs on the incidence and severity of aerotitis media and arosinusitis.

### METHOD AND MATERIALS

This study was accomplished using the double blind technic. The drugs and saline solution were supplied in identical two ounce plastic squeeze bottles labeled consecutively from 0001 to 5000. Neo-synephrine Hydrochloride (brand of phenylephrine hydrochloride) 0.25 per cent, thonzonium bromide 0.5 per cent, phylephrine hydrochloride and thonzonium bromide in combination, and Biomidrin\*\* were the drugs used in this study. Normal saline was used as a control.

Phenylephrine hydrochloride is a widely used vasoconstrictor, known to have rapid and lasting effects and an almost complete absence of side reactions.<sup>6</sup> Thonzonium bromide is a synthetic wetting agent with a marked mucolytic action.<sup>7,8</sup> Biomidrin, in addition to containing a vasoconstrictor and a mucolytic agent, also contains an effective antihistaminic.<sup>9,10</sup>

A total of 4,676 consecutive candidates for submarine training were used as subjects in this study. Of these, 72 per cent were between the ages of 17 and 25, while 28 per cent were from 26 to 39 years of age. Each trainee received a thorough physical examination within four days prior to his pressure test. All were found to conform to the current physical standards for submarine service.

On the day of the pressure test, a history was taken including present illnesses and past history of acute and chronic upper respiratory infections, ear disease, asthma, hay fever, and related allergies. The ears, nose, and throat of each trainee were then examined. All candidates who had objective evidence of severe upper respiratory infection and those who were receiving any form of medical therapy for an upper respiratory infection were excused from the test and were not included in the study.

All the remaining candidates were instructed in the techniques of equalizing the pressure in their middle ears. Each trainee was then given a squeeze bottle and instructed in its proper use.

\*The author is indebted to the Nepera Chemical Co. Inc. Yorkers N. Y. for supplying all drugs and materials used in this study.

Brand name for preparation of Neomycin Sulfate 0.1 per cent. Gramicidin, 0.005 per cent. Thonzylamine Hydrochloride 1.0 per cent. Thonzonium Bromide 0.05 per cent. and Phenylephrine Hydrochloride 0.25 per cent.



Upon completion of the pressure tests, each trainee was asked if he had any difficulty or pain during the test, and his ears, nose, and throat were re-examined. The tympanic membranes were graded in accordance with Teed's classification. Mucous membranes of the nose were graded as normal or as slightly, moderately, or severely congested. The results were recorded, along with the pretest findings and code number of the drug used.

### RESULTS

There was no significant statistical difference between the findings on subjects in the 17 to 25 age group and those on subjects from 26 to 39 years of age.

As shown in table 1, there was physical evidence of injury to one or both ears of 1357 (27.9 per cent) of the subjects. Of the 234 (4.8 per cent) who also failed the pressure test, 230 failed because of earache, 3 because of sinus pain, and 1 for psychological reasons.

TABLE 1 Symptoms of aerotitis media and aerotympanitis as observed in entire group of subjects and in those having a history of allergy

Symptom or sign	Total group		Allergy group	
	Number	Per cent	Number	Per cent
Total	4876	27.9	186	54.3
Ear damage	1357	11.8	101	42.4
Ear pain	576	4.8	79	34.4
Failed test	234	3.3	64	4.8
Sinus pain	161	1.9	9	0.5
Toothache	96	0.9	1	1.6
Nose bleed	48		3	

A positive history for allergy was elicited from 186 of the 4876 candidates tested. Of these, 101 (54.3 per cent) incurred injuries to one or both ears. 79 had earaches, 9 had sinus pain, 3 had nose bleeds, and 1 developed a toothache. Sixty-four (34.4 per cent) failed because of earache. Two of these also had sinus pain.

None of the topical drugs tested exerted a significant prophylactic effect, and any differences observed were well within the limits of random variation. This was true not only concerning

observable ear damage (table 2), but also with reference to the occurrence of symptoms and the state of the nasal mucosa. In 186 subjects with positive histories of allergy, there was some indication that Biomidrin and thonzonium bromide may have been of benefit in reducing the incidence of symptoms and of damage to the sinuses and ears, but the size in this group was too small for definite statistical conclusions.

TABLE 2 Ear damage observed by otoscopic examination after pressure test following prophylactic use of various topical drugs

Test material	Grade of ear damage					Number of ears damaged	Total
	0	I	II	III	IV		
Total	7505	1189	551	406	99	2245	9752
Normal saline	1516	248	113	81	22	464	1980
Phenylephrine	1491	233	114	76	22	445	1936
Thonzonium	1513	236	110	84	23	453	1966
Phenylephrine & thonzonium	1493	210	110	86	17	453	1946
Biomidrin	1494	232	104	79	15	430	1924

### DISCUSSION

The high percentage of damage and failure among subjects with allergic histories supports the premise that they are a poor risk for occupations involving atmospheric pressure changes.

Aerosinusitis and toothache were found to be of relatively little importance in regard to failure to pass the pressure test. Only three failed because of sinus pain alone, and none failed because of toothache alone.

The remarkably low incidence of failure when compared to ear damage can be attributed to two reasons. First, submarine candidates are highly motivated, and their success in submarines is dependent upon their ability to pass the pressure test. Second, the degree of pain and discomfort may not be as severe as is indicated by otoscopic examination.

Comparison of those trainees having ear damage showed that the incidence and severity of pain were greater in those with grades I and II aerotitis media than in those with grades III and IV. It is reasonable to anticipate that pain will occur when the tympanic membrane is stretched and retracted, but understand

was not closely related to arterial hypoxemia. They considered that a normal arterial oxygen saturation could not be taken to mean that the patient was free of disability.

### CASE MATERIAL AND METHODS

One hundred consecutive patients with obstructive pulmonary emphysema were studied. The diagnosis was made by history, physical examinations, roentgenography, fluoroscopy and pulmonary function studies. A case did not have to present positive findings in all these areas to be classified as obstructive emphysema.

The patients were classified clinically into four groups according to the estimated degree of disability severity. The classification was based on statements made by the patient during the interview for clinical history. Except for slight modification the scheme established by the New York Heart Association\* for determining functional capacity was used in this study. The criteria were

#### Group I

- A The patients activity was not limited by dyspnea
- B They could walk an unlimited distance on the level at a normal brisk pace
- C They were able to climb three or more flights of stairs without stopping or experiencing undue discomfort
- D They were able to do prolonged work involving at least moderate exertion without stopping

#### Group II

- A In these patients there was a slight to moderate limitation of activity
- B They could walk several city blocks on the level without stopping or discomfort provided a normal pace was maintained
- C They usually were able to climb two flights of stairs without stopping. After one flight there usually was slight to moderate dyspnea but it was at the end of the second flight that dyspnea usually necessitated stopping or produced discomfort
- D Most of these patients were working full time at jobs with varied exertional demands. Some were doing farming or general labor

#### Group III

- A In these patients severe dyspnea usually imposed considerable limitation of activity

November 1957)

## PULMONARY EMPHYSEMA

1579

B They usually were unable to walk more than one or two city blocks on the level at a normal pace without pausing to rest

C They avoided stairs whenever possible, and one flight at a slow pace usually produced severe dyspnea

D They usually experienced marked weakness, easy fatigability, and the need for a great deal of rest and sleep

E Often, a mild degree of exertion was sufficient to produce paroxysms of cough

F Usually they were able to handle only sedentary work. The capacity to do part time work with frequent rest periods was occasionally described

### Group IV

A These patients often were dyspneic at rest

B They noted less daily variation in symptoms than did patients in Group III

C They usually were forced to rest before completing, at a slow walking pace along the level, a distance equivalent to one city block

D Stair climbing had been discontinued completely because of severe dyspnea and weakness

E They usually were unable to do any type of work, and on occasion needed assistance in eating, toilet, and dressing functions

An ear lobe oximeter as designed by Wood and Geraci<sup>7</sup> was used to determine arterial oxygen saturation. Values obtained by the oximeter were standardized by having the patient breathe 100 per cent oxygen, and the resultant values were considered to equal full (100 per cent) saturation. The patient was then tested on room air at rest and during exercise. Periodic checks of the oximeter readings were made against samples of arterial blood analyzed by a manometric technique.<sup>8</sup>

A standard exercise step test was used.<sup>10</sup> The patient performed the exercise for one minute or until dyspnea and fatigue made it necessary to stop. A maximum of three minutes was set for the exercise of the less disabled.

The clinical classification was determined before roentgenograms, physical examinations, fluoroscopies, or pulmonary function studies were evaluated. Detailed consent was given to interview techniques so as to obtain optimum relationships. The interview was conducted in setting, in preference to the open laboratory, and

to systematized questions and answers on "huffing and puffing". Each patient was provided an opportunity to talk about other problems and concerns insofar as possible the situation was "warmed" by personalized attention, in order to minimize the impact from machines and strange gadgets.

## RESULTS

As shown in table 1 79 per cent of the patients were classified in Groups II and III. It is apparent from the criteria used to determine functional capacity that a significant difference in severity of disability can occur between patients in these two groups and although the variation did extend from a slight to a severe degree of disability the occurrence of hypoxemia in the two groups was nearly identical. Of the 35 patients in Group II 45.7 per cent had hypoxemia at rest or exercise or both. Of the 44 in Group III 45.5 per cent had hypoxemia at rest or exercise or both while an additional 4.5 per cent had no hypoxemia at rest but were unable to exercise.

The differences in the severity of disability between Groups III and IV were not nearly as marked as between Groups II and III. In most instances it was difficult to separate patients into either Group III or IV because of similarities in the patterns of their disabilities. The patients' statements that they had symptoms at rest and experienced a lesser degree of daily variation in symptoms were an important factor in placing patients in Group IV. Despite the absence of striking differences in disability severity a notable difference in frequency of arterial hypoxemia was documented. Of the patients in Group IV 63.3 per cent had hypoxemia at rest or exercise or both while an additional 11.1 per cent had no hypoxemia at rest but were unable to exercise. This compares with 45.5 per cent and 4.5 per cent respectively for Group III. I was unable to correlate this difference between the two groups in frequency of hypoxemia with difference in degree of disability.

In the total series 51 per cent demonstrated hypoxemia at rest or exercise or both, while 4 per cent had no hypoxemia at rest but were unable to exercise. One patient in Group II and one in Group III showed hypoxemia at rest that returned to normal following the hyperventilation of exercise.

Table 1 demonstrates that hypoxemia could not be assessed as having a significant influence on exercise capabilities. Seventeen per cent of the total series had hypoxemia at rest and throughout the exercise stop test which they completed. Thirteen per cent had hypoxemia at rest but were unable either to start or to complete an exercise test. Therefore approximately the same number of patients who had arterial hypoxemia

severity of disability and presence of arterial hypoxemia

Incidence of arterial hypoxemia												
Classification of patients	None at rest unable to exercise		Present at rest, unable to exercise		None at rest or exercise		Present at rest and exercise		Present on exercise only		Present at rest only	
	Num ber	Per cent	Num ber	Per cent	Num ber	Per cent	Num ber	Per cent	Num ber	Per cent	Num ber	Per cent
Group I	3											
Group II	35				3	100	8	22.9	7	20.0	1	2.8
Group III	44				19	54.3	8	18.2	9	20.5	1	2.3
Group IV	18				22	50	1	5.6	3	16.6		
					1	5.6			19		2	
					45		17					
Total	100				45							

while at rest were able to complete the exercise test as were not able to complete it.

The importance of hypoxemia in cases of congestive failure in cor pulmonale in obstructive emphysema can be seen from table 2. Of 14 patients with congestive failure one was in Group III and 13 were in Group IV. Only three of the 14 patients were free of hypoxemia at rest, and one of the three was hypoxic after exercise. The other two were unable to exercise because of weakness and/or dyspnea. One of these two had systemic hypertension but the electrocardiogram demonstrated right axis deviation and the clinical signs were those of right heart failure. He had greatly increased lung volume with marked stigmata of air flow obstruction so was diagnosed as having cor pulmonale with congestive failure.

TABLE 2 Relation between severity of disability, arterial hypoxemia, and congestive failure in cor pulmonale in patients with pulmonary emphysema

Patients with emphysema		Patients with congestive failure	Incidence of hypoxemia		
			Hypoxic at rest	Hypoxic only on exercise	No hypoxemia but unable to exercise
Disability classification	Number	Number	Number	Number	Number
Group III	44	1	1	1	2
Group IV	18	13	10	1	2
Total	62	14	11	1	2

None of the 38 patients in Groups I and II had congestive failure.

## DISCUSSION

That arterial hypoxemia did not correlate closely with severity of disability may be related to the following difficulties encountered during the clinical classification.

1. A question occasionally arose as to the reliability of the patient's account of his capacity to tolerate exercise. This applied to cases where symptoms may have been minimized as well as to those where they may have been exaggerated.
2. There sometimes was a problem as to the proper and most effective interviewing technique for a given patient. Language barriers, vocabulary differences and hostility toward the situation were encountered and the ability to communicate varied greatly among individual patients.

3 A number of patients stated that there were periodic variations in the degree of their symptoms, with episodes that varied from daily to weekly or monthly. As a result, some patients were studied at a time when symptoms were maximum, while others were studied when symptoms were minimum.

That arterial hypoxemia did not appear to have an important influence on exercise capabilities could be related to the following facts:

1 As the chief symptoms, dyspnea and easy exhaustion impose a marked limitation on exercise tolerance. They are so readily and markedly aggravated by even minimal exertion that prolonged activity is usually impossible.

2 Arterial hypoxemia may be delayed in onset. This is characteristic of the so-called "prolonged desaturation time" in emphysema described by Woolf, Gunton, and Paul.<sup>11</sup> If these patients were able to do more prolonged exercising, arterial hypoxemia probably would occur in a greater number of cases and to a greater degree.

Labored breathing and easy exhaustion are the result of abnormalities in the mechanics of respiration. Increased air flow resistance manifested by inability to achieve a high rate of air flow during expiration, poor intrapulmonary mixing of gases, and large intrapleural pressure fluctuation during quiet breathing are the primary defects.<sup>12</sup> Increased force is required to move air into and out of the lungs. This force is supplied by the muscles of respiration increasing their work output. Alveolar hypoventilation is present because of poor intrapulmonary mixing of gases. The compensatory response to this is hyperventilation. A dilemma thereby exists for the emphysematous patient. He must meet the demands of alveolar hypoventilation by hyperventilating against resistant forces that increase the workload tremendously. Oxygen utilization is attained only by ventilating an abnormally large amount of air. This inefficient pattern of respiration is what is meant by the "increased work of breathing." Riley<sup>13</sup> has defined the work of breathing as the oxygen cost of breathing. He has demonstrated that patients with air-flow obstruction must produce a large minute volume to effect a relatively small amount of oxygen utilization. Normal subjects are able to effect a much more efficient relationship between minute volume and oxygen utilization.

The prolonged desaturation time may be a function of the large functional residual capacity and poor intrapulmonary mixing of gases. Because of these two abnormalities, the patient starts the test with a large volume of oxygen in his lungs and an inefficient washout mechanism. Oxygen is slowly absorbed from



poorly ventilated areas and remains in relatively high concentration in these areas because of poor washout

That congestive failure in cor pulmonale was limited almost entirely to patients with arterial hypoxemia raises the consideration of utilizing intermittent oxygen therapy. The importance of this therapy in patients with hypoxemia relates to current concepts of hypoxia and pulmonary hypertension. The effects of hypoxia on pulmonary circulation have been stressed by a number of investigators,<sup>14-16</sup> who have found a highly significant correlation between anoxia and increased pulmonary artery pressure. In their opinion anoxia is of definite importance in the genesis of pulmonary hypertension. When intermittent oxygen therapy is not utilized to combat chronic anoxia other approaches to the problem would include

- 1 Improving air flow dynamics and intrapulmonary mixing of gases by mechanical and pharmacologic means
- 2 Effecting further control of situations and activities that aggravate the degree of hypoxia
- 3 Investigating biological and mechanical means whereby oxygen storage capacity can be improved. Nature has provided man with the capacity for storing a 40 day supply of carbon compounds from which energy and building materials for cellular activity can be derived. However, should the flow of fresh oxygen be cut off from the arterial blood man has but a four minute supply of oxygen with which to burn this bountiful harvest of stored carbon compounds.

### CONCLUSIONS

Arterial hypoxemia did not correlate closely with the degree of disability or with tolerance to exercise in patients with pulmonary emphysema. The individual patient with either slight or severe disability may have a normal arterial oxygen saturation. These results indicate that the severity of disability in a case of emphysema cannot be judged by knowing only the status of arterial oxygen saturation.

The presence of congestive failure in cor pulmonale was almost entirely limited to patients with hypoxemia. The incidence was greatest in those patients with persistent (resting) hypoxemia.

### SUMMARY

A study was made to determine the correlation between the degree of disability and arterial hypoxemia in 100 consecutive patients with chronic obstructive pulmonary emphysema. The diagnosis in each case was based on combined clinical findings

and pulmonary function studies. The patients were classified in four groups according to an estimation of the severity of disability based on statements made during the interview for clinical history. Except for slight modification, the criteria established by the New York Heart Association for grading functional capacity, or disability severity, were utilized.

A continuous recording ear-lobe oximeter was used to determine arterial oxygen saturation. Periodic checks of the oximeter readings were made against samples of arterial blood analyzed by manometric technique.

Poor correlation was found between arterial hypoxemia and the clinical profile of disability severity, indicating that disability cannot be assessed solely on the basis of the degree of arterial oxygen saturation. The importance of arterial hypoxemia on hemodynamics in the pulmonary circulation is discussed, and certain approaches to the problem are suggested.

#### REFERENCES

- 1 Miller R O, Fowler T S and Helmholtz H F Jr. Relationship of arterial hypoxemia in disability and to cor pulmonale with congestive failure in patients with chronic pulmonary emphysema. *Proc Staff Meet Mayo Clin*, 28: 737-743 Dec 30 1953.
- 2 Ornstein G G. New approach to understanding of pulmonary emphysema: method of determining emphysema of lungs. *Quart Dull Sea View Hosp*, 9: 87-116 Apr 1947.
- 3 Jacobs S. Pulmonary emphysema: clinical forms. *Am Pract & Digest Treat*, 2: 681-685 Aug 1951.
- 4 Massey F C. Physiologic basis of pulmonary disease. In Pullen, R L (editor). *Pulmonary Diseases*. Lea & Febiger, Philadelphia, Pa, 1955, p 27.
- 5 Wilson R H (Minneapolis), Borden C W and Ebert R V. Adaptation to anoxia in chronic pulmonary emphysema. *A. M. A. Arch Int Med*, 88: 391-390 Nov 1951.
- 6 Friedberg C K. *Diseases of the Heart*. W B Saunders Co, Philadelphia, Pa, 1956, p 157.
- 7 Wood E H and Geraci J E. Photoelectric determination of arterial oxygen saturation in man. *J Lab & Clin Med*, 34: 387-401 Mar 1949.
- 8 Riley R L, Proemmel O O and Franke R E. Direct method for determination of oxygen and carbon dioxide tensions in blood. *J Biol Chem*, 161: 621-633 Dec 1945.
- 9 Van Slyke O O and Neill J M. Determination of gases in blood and other solutions by vacuum extraction and manometric measurement. *J Biol Chem*, 61: 523-573 Sept 1924.
- 10 Baldwin E deF, Cowman A and Richards D W Jr. Pulmonary insufficiency: physiological classification, clinical methods of analysis, standard values in normal subjects. *Medicine*, 27: 243-278 Sept 1948.
- 11 Woolf, C R, Gunton R W and Paul W. Simple tests of respiratory function using direct writing ear oximeter. *Am Rev Tuberc*, 74: 511-532 Oct 1956.
- 12 Fry D L, Ebert, R V, Stead W W and Brown C C. Mechanics of pulmonary ventilation in normal subjects and in patients with emphysema. *Am J Med*, 16: 80-97, Jan 1954.
- 13 Riley R L. Work of breathing and its relation to respiratory acidosis. (Editorial). *Ann Int Med*, 41: 172-176 July 1954.
- 14 Van Liengen B and Whidborne J. Oximetry in congenital heart disease with special reference to effects of voluntary hyperventilation. *Circulation*, 6: 740-748 Nov 1952.
- 15 Hurst A, Dressler S H and Denst J. Relationship between pathological

change blood vessel in resected lobes and lungs as correlated with pulmonary artery pressure changes recorded during cardiac catheterization *Dis Chest* 24 41-48 July 1953

16. Lewis B M and Golin R Effects of hypoxia on pulmonary circulation of dog *Am J Physiol* 170 574-587 Sept 1952.

17. Zimmerman H A. Study of pulmonary circulation in man. *Dis Chest* 20 46-47 July 1951

18. Ye, P N G Lovejoy F W Jr Joos H A Nye R E Jr and McCann, W S. Studies of pulmonary hypertension pulmonary circulatory dynamics in patients with pulmonary emphysema at rest *J Clin Invest* 32 130-137 Feb 1953

19. Bierman H R. Pulmonary circulation times with particular relationship to acute hypoxia. *Am J Med Sci* 2 162-173 Aug 1951

## REHABILITATION OF THE CARDIAC PATIENT

"The process of rehabilitation begins at the moment the patient is first stricken with his disease. The goal is the maximal attainment within the patient's capacities. In approximately 80 per cent of cardiac patients the total program can be managed by the private physician; in others a team approach and help from specialists is necessary. It is assumed that adequate attention has been given to medical therapy, rest, relief of pain, oxygen requirements, nutrition, and sedation. In addition, the patient's emotional problems must be dealt with. The period of passivity which is frequently required at first should be terminated as soon as possible. The periods of hospitalization and of convalescence at home are followed by a period of vocational readjustment, and each presents problems that can be solved on the basis of available facts. There has been no evidence that employment has aggravated the underlying disease in cardiac patients, and there have been no medicolegal compensation cases involved in the employment of such patients."

—HERMAN K. HELLERSTEIN, M.D.

in *Journal of American Medical Association*

p. 225 May 18, 1957

# JELLYFISH STINGS AND THEIR MEDICAL MANAGEMENT

BRUCE W. HALSTEAD *Lieutenant Commander MC USNR*

**S**TINGS from jellyfishes and related coelenterates are of frequent occurrence among swimmers, fishermen, and skin divers. Because of the nature of their activities, jellyfish stings are not uncommon among naval personnel. Fortunately, most coelenterate stings are mild in nature, and cause only minimal discomfort to the victim. In rarer instances they can produce serious injury, and on occasion sudden death. The purpose of this article is to discuss the medical significance of certain coelenterates that are considered to be especially dangerous to man, and the medical management of their stings.

## CLASSIFICATION

The phylum Coelenterata, in which are grouped hydroids, jellyfishes, sea anemones, and corals, consists of simple metazoans having primary radial, biradial, or radiobilateral symmetry. They are composed essentially of two epithelial layers and but one internal cavity, the gastrovascular cavity or coelenteron, which opens only by the mouth. A dominant character of the group is the presence of tentacles equipped with nematocysts, or "stinging cells." The phylum Coelenterata generally is divided into three classes.

### Hydrozoa (the hydroids)

To this class belong the hydroids that are commonly found growing in plumelike tufts on rocks, seaweeds and pilings. Small medusae are budded from these branching polyps. One of the most common stinging members of this group is *Physalia*, the Portuguese-man-of-war, which is a pelagic colonial medusa.

### Scyphozoa (the jellyfishes or true medusae)

This class includes the larger medusae having eight notches

---

From U. S. Naval Medical School, National Naval Medical Center, Bethesda, Md.  
This research was aided by a contract payment to the School of Tropical and Preventive Medicine, College of Medical Evangelists, Loma Linda, Calif., from the School of Aviation Medicine, U. S. Air Force, Randolph Air Force Base, Tex., and a grant from the U. S. Public Health Service.

in the margin of their bell. The deadly cubomedusae or box wasps, *Chiropsalmus* and *Carybdea*, are examples of this class.

*Anthozoa* (the sea anemones, corals and alcyonarians or soft corals)

The medusan stage is absent in this group, and many of the polyps are colonial. The corals are notable for their precipitation of calcareous skeletal structures and their role as reef builders. Important venomous examples are the anemones, *Sagartia*, *Actinia*, and *Anemonia*.

## COELENTERATES ESPECIALLY DANGEROUS TO MAN

### Hydrozoans

*Millepora alcicornis* Linnaeus—stinging coral, false coral, fire coral (fig. 1). Tropical Pacific, Indian Ocean, Red Sea, and Caribbean Sea.



Figure 1 *Millepora alcicornis* Linnaeus—stinging coral

*Physalia physalis* (Linnaeus)—Portuguese-man of war, blue bottle (fig. 2). Tropical Atlantic, occasionally as far north as the Bay of Fundy, the Hebrides, and Mediterranean Sea.

*Physalia utriculus* (La. Martiniere)—Portuguese man of war, blue bottle. Indo-Pacific, as far north as southern Japan, and Hawaiian Islands.



Figure 2 *Physalia physalis* (Linnaeus)—Portuguese man of war

### Scyphozoans

*Carybdea alata* Reynaud—sea wasp (fig 3) Tropical Pacific, Atlantic Ocean, and Indian Ocean

*Chironex fleckeri*\* Southcott—Queensland and Northern Territory, Australia

*Chiropsalmus quadrigatus*\* Haeckel—sea wasp (fig 4) Northern Australia, Philippines, and Indian Ocean

*Chiropsalmus quadrumanus* (Müller)—sea wasp from Brazil to North Carolina, Indian Ocean, Australia

---

*C. fleckeri* and *C. quadrigatus* may be the same species

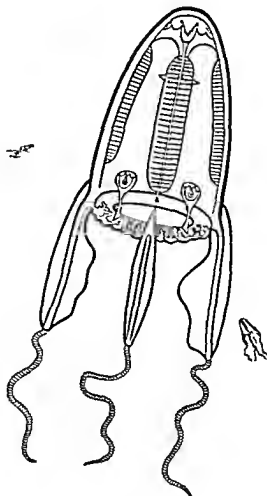


Figure 3 *Carybdea alata* Reynaud—sea wasp

*Cyanea capillata* (Linnæus) (fig 6)—sea blubber, hairy stinger, sea nettle North Atlantic and Pacific, southern coast of New England to the Arctic Ocean, France to northern Russia, Baltic Sea, Alaska to Puget Sound, Japan, and China Other stinging species of this genus are found in the tropical and temperate Pacific Ocean

*Dactylometra quinquecirrha* Desor—sea nettle (fig 7) Azores and New England to the tropics, West Africa, Indian Ocean, western Pacific from Malay Archipelago to Japan, and Philippines

#### Anthozoa

*Acropora palmata* (Lamarck)—elk horn coral Florida Keys, Bahamas, and West Indies



Figure 4 *Chiropsalmus quadrigatus* Haeckel—sea wasp

*Actinia equina* Linnaeus—sea anemone (fig 8) Eastern Atlantic from Arctic Ocean to Gulf of Guinea, Mediterranean Sea, Black Sea, and Sea of Azov

*Anemonia sulcata* (Pennant)—sea anemone (fig 9) Iceland to Atlantic coast of France, Mediterranean Sea, and coast of Africa

#### VENOM APPARATUS OF COELENTERATES

The venom apparatus of coelenterates consists of nematocysts, or stinging cells. The term stinging cell actually is a misnomer, however, inasmuch as the structure is not a cell, but rather an organoid that is thought to be composed of chiton (fig 10). Nematocysts usually are most abundant on tentacles, grouped on protuberances and circular or spiral ridges. They also are



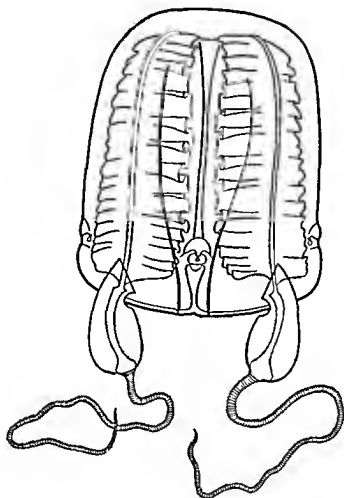


Figure 5 *Chiropsalmus quadrumanus* (Müller)—sea anemone

found in the epidermis of the oral region, and on internal tentaclelike structures, i. e. the gastric filaments, the septal filaments, and the acontia. Nematocysts initially develop inside interstitial cells, termed cnidoblasts or nematocytes. The developmental site of the nematocyst is usually some distance from the region in which it is finally utilized. Transportation of the cnidoblasts containing developing nematocysts is by amoeboid movement through the body wall or by way of the gastrovascular cavity to their final destination in the ectodermal epithelium.

The essential features of the nematocyst apparatus are as follows. The capsule like nematocyst is contained within the outer cnidoblast, which is fixed in the epidermis by a slender stalk connecting with the mesogloea. Projecting at one point on the outer surface of the cnidoblast is the triggerlike cnidocil.

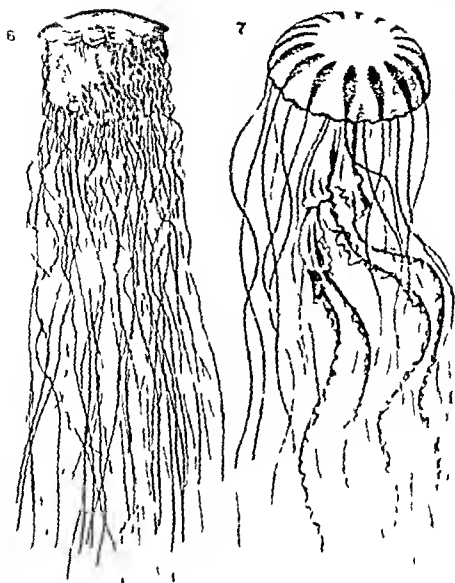


Figure 6 *Cyanea capillata* (Linnaeus)—sea blubber Figure 7  
*Dactylometra quinquecirrha* Desor—sea nettle

Near the base of the cnidocil, in the periphery of the cnidoblast, there usually is found a circlet of stiff rods, probably of a supporting nature, and frequently a basketwork of sinuous fibrils that extend down into the stalk of the cnidoblast. Contained within the fluid filled capsule is the hollow, coiled, thread tube containing the folded spines. The opening through which the thread tube is everted is closed prior to discharge by a lidlike device called the operculum. The fluid within the capsule is the venom. Stimulation of the cnidocil appears to produce a change in the capsular wall of the nematocyst causing the operculum to spring open and the thread tube to evert (fig 11). The exact nature of the mechanism is not understood.

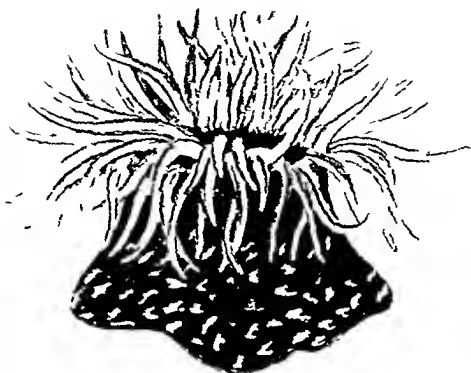


Figure 8. *Actinia equina* Linnaeus—sea anemone

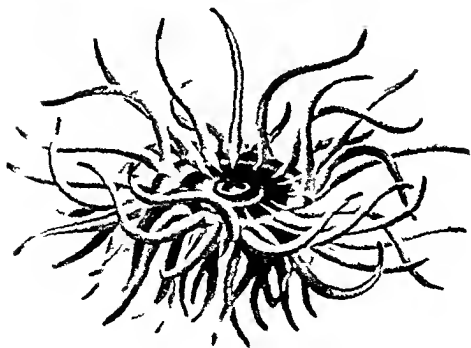


Figure 9. *Anemonia sulcata* (Pennant)—sea anemone

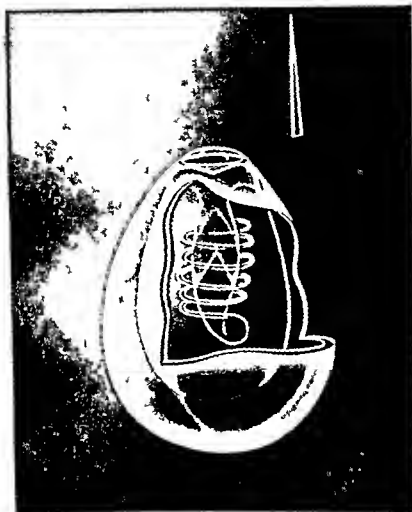


Figure 10. Undischarged stinging cell or nematocyst of a coelenterate. Note the coiled threadlike tube which conveys the venom. (Semidiagrammatic, greatly enlarged)

### MEDICAL ASPECTS

There are no accurate statistics regarding the incidence of jellyfish stings among American military personnel, but Southcott<sup>1</sup> stated that while serving as regimental medical officer to a battalion attached to an Australian beach group at Palm Beach, north of Cairns, Queensland, during the period from December 1943 to January 1944, there were about 100 persons stung by jellyfish. One would assume from this that the over all incidence is probably quite high. Unfortunately, there is even less information available regarding other types of coelenterate stings.

#### Clinical Characteristics

The symptomatology of coelenterate stings varies according to the species, the site of the sting, and the person. In general, the symptoms produced by hydroids and hydroid corals are primarily local skin irritations. Sea anemones and true corals produce a similar reaction, but this may be accompanied by general



Figure 11 The discharged stinging cell or nematocyst of a coelenterate (Semidiagrammatic greatly enlarged)

symptoms. Ulcerations of the skin may be severe in the sponge-fishermen's disease produced by *Sagartia*. Symptoms resulting from siphonophores and scyphozoans vary greatly. *Physalia* stings may be very painful. The sting of most scyphozoans is too mild to be noticeable, whereas *Cyanea Dactylometra*, *Chiropsalmus*, and *Chironex* are capable of inflicting very painful local and generalized symptoms. *Chiropsalmus* and *Chironex* are probably the most venomous marine organisms known and may produce death within 3 to 8 minutes in man.<sup>1-4</sup>

Contact with the tentacles of coelenterates results in symptoms ranging from an immediate mild prickly or stinging sensation like that of a nettle sting to an intense burning, throbbing, or shooting pain which may render the victim unconscious

In some cases the pain is restricted to an area within the immediate vicinity of the contact. In others it may radiate to the groin, abdomen, or axilla, depending on the initial site of the lesion, or it may become somewhat generalized. The local pains may be followed by a feeling of numbness or, sometimes, hyperesthesia. The area coming in contact with the tentacles usually becomes erythematous. This is followed by pronounced urticaria, blistering, swelling, and petechial hemorrhages. In sponge-fishermen's disease there may be a rash that becomes cystic, followed by multiple abscesses, necrosis, and sloughing of the tissues. Jellyfish may cause redness and flushing of the face, increased perspiration, lacrimation, coughing, sneezing, and rhinitis. An asthmatic-like condition has been reported as a result of inhaling dust containing dried jellyfish tentacles.<sup>9</sup>

The above-mentioned signs and symptoms may be accompanied by headache, malaise, primary shock, collapse, faintness, pallor, weakness, cyanosis, nervousness, hysteria, chills, and fever. In severe cases there may be muscular cramps, abdominal rigidity, diminished tactile and temperature sensation, nausea, vomiting, backache, aphonia, frothing at the mouth, sensation of constriction of the throat, respiratory distress, paralysis, delirium, convulsions, opisthotonos, cardiac standstill, and death.

The recovery period varies from a few hours to several weeks. Gunn<sup>10</sup> reported a case in which there was complete disappearance of the subcutaneous fat in the vicinity of the lesion. Stings from coelenterates may result in developing a sensitivity to the toxin, and a subsequent sting may produce a fatal anaphylactic reaction. An important factor in jellyfish sting fatalities is primary shock and subsequent drowning before the victim can be rescued.

The following case report is representative of the more severe types of coelenterate stings.

#### CASE REPORT

A six year old Filipino boy was swimming in about 2 feet of water at Camantilis, Hundred Islands National Park, Pangasinan, Luzon. His sudden piercing screams brought several men running to his rescue. One of the men found a jellyfish by the side of the boy. Within moments the child was picked up and rushed to his home, which was within 10 yards of the seashore. He was found to be frothing at the mouth, and his respiration was spasmodic. His arms appeared to be partially paralyzed. There were large, irregularly shaped, dark brown welts on his chest, arms, and neck, wherever the tentacles of the jellyfish had come in contact with his body. In less than five minutes after his rescue the child died. After his death his face, neck, and arms became severely swollen.

The jellyfish measured about 6 inches in diameter with tentacles four feet in length. The organism was later identified by some of the local authorities as *Chiropsalmus quadrigatus* Haeckel.

### Treatment

A variety of measures have been suggested for the therapeutic management of coelenterate stings. Treatment must generally be directed toward accomplishing three primary objectives: relieving pain, alleviating neurotoxic effects, and controlling primary shock. Morphine sulfate has been found to be effective in relieving pain. Intravenous injections of calcium gluconate have been recommended for the control of muscular spasms. Histaminics by mouth and topical cream are useful in treating the urticarial lesions. Dilute ammonium hydroxide, sodium bicarbonate, olive oil, sugar, ethyl alcohol, and other types of soothing lotions have been used with varying degrees of success. Artificial respiration, cardiac and respiratory stimulants, and other forms of supportive measures may be required. The use of steroids also has been suggested. There are no known specific antidotes for coelenterate venoms.

### Preventive Measures

Particular care should be exercised by bathers swimming in areas in which dangerous coelenterates, especially the cubomedusae, *Chiropsalmus*, *Chironex*, *Carybdea*, and *Physalia*, are known to exist. It should be kept in mind that the tentacles of some species may trail a great distance from the body of the animal; consequently, they should be given a wide berth. Tight-fitting, long, woolen underwear or rubber skin diving suits are useful in affording protection from attacks from these creatures. Jellyfish washed up on the beach, even though appearing dead, may be quite capable of inflicting a serious sting. The tentacles of some jellyfish may cling to the skin. Care should be exercised in the removal of the tentacles, or additional stings will be received. Use a towel, rag, seaweed, stick, or handful of sand. Swimming soon after a storm in tropical waters in which large numbers of jellyfish were previously present may result in multiple severe stings from remnants of damaged tentacles floating in the water. Upon being stung the victim should make every effort to get out of the water as soon as possible because of the danger of drowning. Diluted ammonia and alcohol should be applied, and other therapeutic measures should be instituted as promptly as possible.

Since coral cuts are frequently associated with coral stings, a few remarks regarding these lesions are pertinent to the general subject. Anyone handling or wading around corals soon suffers from their sharp traumatogenic exoskeletons.

If coral cuts are left untreated, a mere scratch may within a few days become an ulcer with a septic sloughing base surrounded by a painful zone of erythema. In general, the symptoms appear to be far in excess of the visible lesions present. The severity of coral cuts is probably due to a combination of factors: laceration of tissues, introduction of foreign substance into the wound, i. e., minute bits of calcium carbonate from the animal's exoskeleton and possibly nematocyst venom, secondary bacterial infection, and adverse climatic and living conditions. Treatment consists of prompt cleansing of the wound, removal of foreign particles, débridement if necessary, and the application of antiseptic agents. In severe cases it may be necessary to give the patient bed rest with elevation of the limb, knolin poultices, magnesium sulfate in glycerin solution dressings, and antibiotics.<sup>11-13</sup> Levin and Behrman<sup>14</sup> found roentgen therapy to be useful in resolving a chronic coral ulcer with keloidal formation.

### TOXICOLOGY

The venom of coelenterates is believed to contain three toxic fractions:

#### Thalassin

According to Richot,<sup>11-12</sup> Pawlowsky,<sup>21</sup> and Maass,<sup>22</sup> intravenous injection of this fraction into dogs was found to produce sneezing, pruritus, urticaria, genital excitation, vasodilatation, edema of the face, nervousness, redness, coughing, rhinitis, rolling on the ground, conjunctivitis, nervous depression, cardiac arrest, and death. Thalassin is especially characterized by its pruritogenic properties. The lethal dose in dogs is said to be 0.02 gram per kg. Thalassin was first obtained from the tentacles of *Anemonia sulcata*, but is believed to be present in most other coelenterates.

#### Congestin

According to Richot,<sup>11-12</sup> 20-21, 24-27 Pawlowsky, and Maass,<sup>22</sup> intravenous administration of the poison into dogs resulted in vomiting, bloody diarrhea, evidence of abdominal pain, prostration, decrease in blood pressure, intense splanchnic vasodilatation, respiratory paralysis, and death. Congestin received its name because of the characteristic intense splanchnic congestion that it produces. The lethal dose in dogs is said to be 0.005 gram per kg of animal weight. This drug was likewise first obtained from the tentacles of *Anemonia sulcata*. Dujarric de la Riviere<sup>23</sup> isolated a substance from the tentacles of the jellyfish, *Rhizostoma cuvieri*, which he termed medusocongestin; however, it is believed to be identical with congestin.



## Hypnotoxin

This substance is characterized by producing a central nervous system depression affecting both motor and sensory elements. Symptoms most commonly encountered are inactivity, coma, muscular paralysis, and cutaneous anosthosis when injected intramuscularly into laboratory animals. Death was reported from respiratory paralysis, but the lethal dose is not known. Hypnotoxin was first obtained by Portier and Richet<sup>10, 11</sup> from the tentacles of *Physalia*.

## CHEMISTRY

Richet<sup>7-11, 12</sup> distinguished between thalassin and congestin on the basis of difference in solubility in alcohol. Ackermann, Holtz, and Reinwein<sup>13</sup> investigated the problem of the structure of coelenterate venom and believed it to be identical with tetramethylammonium hydroxide. Proof of identity was said to be in the coincidence of certain physical properties of a number of derivatives of the toxin as compared to the properties of the same derivatives prepared from this quaternary base. The question that remains is whether all of the physiologic properties ascribed to thalassin can be accounted for in terms of tetramethylammonium hydroxide. A subsequent study by Sondorhoff<sup>14</sup> did not provide an answer to this question. More recently Kelsch<sup>15</sup> has reported that the pain producing factor in coelenterate tentacle extracts is probably serotonin (5 hydroxytryptamine), whereas paralysis could be due to two or more related quaternary ammonium bases such as tetramethylammonium and urocanyl choline.

According to Portier and Richet<sup>10, 11</sup> hypnotoxin is believed to be a heat-sensitive, nondialyzable toxin with protein properties. Crutchfield<sup>16</sup> corroborated the heat sensitivity of the toxin and observed that it was digestible by trypsin. Little else is known about the chemistry of these interesting venoms.

## SUMMARY

Stings from jellyfishes and related coelenterates are of frequent occurrence among persons swimming in tropical waters. The venom apparatus of coelenterates consists of the nematocysts or "stinging cells" that are largely located on their tentacles. The symptomatology of coelenterate stings varies according to the species, the site of the sting, and the person. Deaths from some species of jellyfish may occur within 3 to 8 minutes. Morphine sulfate, calcium gluconate, histaminics by mouth, and various soothing lotions have been used in the treatment of these stings with varying degrees of success. Coelenterate venom is believed to be comprised of three basic fractions, which have been called thalassin, congestin, and hypnotoxin. The principal

effects produced are pruritus, vasocongestion, and circulatory system depression, respectively. Little is known of the chemistry of the venoms. It is believed, however, that pain-producing factor is probably serotonin (5-hydroxytryptamine) and that paralysis may be due to two or more related quaternary ammonium bases such as tetramethylammonium and triethylcholine. The dearth of reliable scientific data on this subject suggests the need for additional research on coelenterate venoms.

**ACKNOWLEDGMENTS** The author is indebted to Mr. Claro Martin, Chief Fisheries Research Division, Bureau of Fisheries, Republic of the Philippines, for the case report; to Dr. Donovan Courville and Mr. Don R. Coe, School of Medicine, College of Medical Evangelists, for the summarization on coelenterate venom; and to Mr. Robert Arcusinger, College of Medical Evangelists, for the preparation of the illustrations.

#### REFERENCES

1. Southcott R. V. Studies on Australian cubomedusae including new genus and species apparently harmful to man. *Australian J. Marine & Freshwater Research* 7: 254-280 July 1956.
2. Light S. F. Some Philippine Scyphomedusae including two new genera five new species and one new variety. *Philippine J. Sci. Ser. D* 9: 195-231 June 1914.
3. Light S. F. Another dangerous jellyfish in Philippine waters. *Philippine J. Sci. Ser. D* 9: 291-295, 1914.
4. Wade H. W. Post mortem findings in acute jelly-fish poisoning with sudden death in status lymphaticus. *Am. J. Trop. Med.* 8: 233-241 May 1928.
5. McNeill, F. A. and Pope E. C. Venomous medusae from Australian waters. *Australian J. Sci.* 5: 188-191 June 1943.
6. McNeill F. A. and Pope E. C. Deadly poisonous jellyfish. *Australian Museum Mag.* 8: 127-131 Apr. June 1943.
7. McNeill F. A. Injuries by unknown agents to bathers in North Queensland. *M. J. Australia* 2: 29 July 7 1945.
8. Flecker H. Fatal attacks to North Queensland bathers. *M. J. Australia* 1: 35-38 Jan. 12 1952.
9. Fish poisons (Notes and Comments section). *U. S. Nav. W. Bull.* 20: 466-467 Apr. 1924.
10. Gunn M. A. R. Localized fat atrophy after jelly-fish sting. *Brit. M. J.* 2: 687 Sept. 24 1949.
11. Paradise W. E. J. Injuries and lesions caused by bites of animals and insects. *M. J. Australia* 2: 650-652 Dec. 20 1924.
12. Byrne K. Coral cut. *M. J. Australia* 2: 649-650 Dec. 20 1924.
13. Preston F. S. Coral ulcer. *Brit. M. J.* 1: 642-644 Mar. 18 1950.
14. Levie O. L. and Behrman H. T. Coral dermatitis. *Arch. Dermat. & Syph.* 44: 600-603 Oct. 1941.
15. Richet C. Du poison pruritogène et urticant contenu dans les tentacules d'Actinies. *Compt. rend. Soc. de biol.* 54: 1438-1440 Dec. 13 1902.
16. Richet C., Pertet A. and Portier P. Des propriétés chimiques et physiologiques du poison des Actinies (actinotoxine). *Compt. rend. Soc. de biol.* 54: 788-790 June 28, 1902.
17. Richet C. Des poisons contenus dans les tentacules des Actinies (Coogestine et thalassine). *Compt. rend. Soc. de biol.* 55: 246-248 Feb. 21 1903.
18. Richet C. De la thalassine toxine cristallisable pruritogène. *Compt. rend. Soc. de biol.* 55: 707-710 June 6 1903.
19. Richet C. De la thalassine considérée comme antitoxine cristallisée. *Compt. rend. Soc. de biol.* 55: 1071-1073 July 25 1903.
20. Richet, C. Des effets prophylactiques de la thalassine et anaphylactiques de

- la congestine dans le virus des actinies *Compt rend Soc de biol* 56 302-303 Feb 20 1904
- 21 Richet C. Nouvelles expériences sur les effets prophylactiques de la thalassine *Compt rend Soc de biol* 56 775-777 May 7, 1904.
- 22 Richet, C. De la thalassine proutogène chez les crevettes (Crangon), *Compt rend Soc de biol* 56 777-778 May 7 1904
23. Pawlowsky E. N. Gifttiere und ihre Giftigkeit, Gustav Fischer Jens Germany 1927
- 24 Richet C. Des effets anaphylactiques de l'actinotoxine sur la pression artérielle *Compt rend Soc de biol* 54 837-838 July 5 1902
- 25 Richet C. De l'action de la congestine (virus des Actinies) sur les reins et ses effets anaphylactiques *Compt rend Soc de biol* 58 109-112 Jan 21 1905
26. Richet C. De l'anaphylaxie après injections de congestine chez le chien *Compt rend Soc de biol* 58 112-115 Jan 21 1905
- 27 Richet C. Notize über Thallasin *Arch f d ges Physiol* 108 369-388, June 17 1905
- 28 Masss T. A. *Gifttiere Tabulae biologicae* Edited by W Junk, Th Hague 13 1 272 1937
- 29 Dujardin de la Rivière R. Sur l'existence d'une medusocongestine *Compt rend Soc de biol* 78 596-600 Nov 20 1915
- 30 Portier P. and Richet C. Sur les effets physiologiques du poison des filaments pécheurs et des tentacules des Coelenteres (hypnotoxine) *Compt rend Acad d. Sc* 134 247-248, 1902
- 31 Portier P. and Richet C. De l'action anaphylactique de certains virus. *Compt rend Soc de biol* 54 170-172 1902
- 32 Ackermann D. Holtz F. and Reinw. In H. Reindarstellung und Konstitutionsermittlung de Tetramins ein s Giftes aus Aktinien quins *Zischer f Biol* 79-113-120 1923
- 33 Sonderhoff R. Über das Gift der Seeanemone *Ann d Chem (Liebig s)* 525(2-3) 138-150 1936.
- 34 Welsh J. H. On the nature and action of coelenterate toxins *Proc Mar Biol Oceanogr Deep-Sea Research* 5 pp. 3 287-297 2 figs 3 tabs 1955
- 35 Crutchfield E. D. Dermatitis produced by Portuguese Man-of-war *Arch Dermat & Syph* 12 72-75 July 1925

## IMPAIRMENT FROM ALCOHOL

The effects of alcohol vary with individual tolerance and length of usage. In an individual of average weight two ounces of whiskey are enough to produce a blood alcohol level of 0.05 percent—an amount sufficient to produce an average impairment of 25 percent. Alcohol is eliminated from the blood at the rate of about one third of an ounce per hour. Physiological impairments thus are likely to last for hours depending on the amount consumed.

—MORRIS SCHULZINGER, M. D.  
in *Industrial Medicine and Surgery*  
p 453 Oct 1936

# ICARUS AND THE PHYSICIAN

## Reflections on Aircraft Accidents and Their Prevention

FRANK B. BERRY M. D.

*Daedalus and his son Icarus are two earliest recorded flyers. They were Athenians and went to the Island of Crete to build a labyrinth. Eventually they themselves were imprisoned there. In order to escape, Daedalus made a pair of wings for each which were held to the body by some form of wax. Daedalus warned his son Icarus not to get too near the sun as the wax would melt. They both escaped from the labyrinth but Icarus did not obey his father's warning and as a result of flying too high and getting too near the sun, he fell into the sea and drowned. Daedalus, on the other hand, arrived safely in Sicily. These are early examples of both faulty engineering, although Daedalus probably used the best materials that were available, and pilot failure in that Icarus did not obey the instructions of his father, the engineer who knew of the weakness in the flying equipment which he had designed.*

**A**T DUSK one evening some years ago I stood by the edge of a British air field in North Africa and watched the flight of bombers take off in exact precision, one after the other, for their evening bombing run. Except for enemy action there was never a thought but that they would all return safely to their base. There were no weather problems, the pilots and crews were well trained and maintenance was good. There was the will to co-operate and do the best job possible.

During the month of February 1956, we witnessed almost without comment, other than the factual recording of each, a sobering series of fatal airplane accidents for almost all of which there was no question of weather. To list a few, we had a B 52, two B 47s, a B 50, a Navy jet, a Marine transport, and chartered British Army transports in Egypt and Malta. In addition, we have had our own transport accidents in the past—the commercial, the larger military and chartered military planes—and here again frequently there was no question of bad weather. We are becoming

---

The second Louis H. Bauer Lecture Presented April 16, 1956 at the 27th annual meeting of the Aero Medical Association, Chicago. Reprinted from *The Journal of Aviation Medicine* 27: 197-207, June 1956.

Dr. Berry is Assistant Secretary of Defense (Health and Medical), Washington, D. C.

calloused to fatal accidents involving our youth both by the automobile and the airplane, and the public is comparatively unaroused by them, yet I am sure that the parents and wives have wondered. Must we accept this increasing toll or can something be done about it?

In an informal report and also in recent testimony before Congress I have deplored the fatalities incurred in routine training of pilots, crews and cadets both in the Air Force and Naval Aviation. As I ponder this question it seems to me there are several causes involved. At the moment we can do something about some of them, although for the time being the others may be beyond our ken as are the new problems that are bound to arise from our rapid technological advances. In order to protect and preserve these young men, it is of the utmost importance that we exert every effort to minimize their loss, even when in so doing the chips may fall in some places where they hurt. I speak not only of military aviation but also of civilian, and although the problems are somewhat different in both, they are also similar.

### THE BACKGROUND

As I have discussed in earlier addresses dealing with problems of personnel, we have been and still are in a period of short supply of manpower due to the decreased birth rate in the 1930 decade, and are only now beginning to approach the same monthly figure of boys turning eighteen years old as was the case in the mid 1940's. Within the next two or three years we shall exceed it and our pool of manpower will begin to mount rapidly. In a special report "Some Figures That Startle the Cabinet" in the February *U S News and World Report* there is a summation of this situation. Army tests show that one in nine youths examined were too illiterate for the Armed Forces (11 per cent), and of those accepted for training one in every three examined were found to be unsuitable for advanced training (33.3 per cent), which decreases available manpower still further.

Although the number of graduates from our medical schools is increasing at a slightly higher rate than is our population, this comparison is only valid *per se*. It does not take into account the rapidly expanding demands of our changing civilization. In 1900, for example, our population was 76 000 000 and in 1950 it was 157 700 000 slightly more than double. You may think that this can be readily explained because of the rapid advances in preventive and therapeutic medicine and surgery during this half century, and there is no question but that these are extremely important contributing agents. But there are complicating factors, for during this same period our Negro population almost doubled from 8 800 000 in 1900 to 15 000 000 in 1950 and in the same fifty years well over 20 000 000 of the total increase in population was

due to immigration. So what would have happened to our intrinsic growth rate had the composition of the population remained unchanged after 1900 is open to speculation.

From an educational viewpoint, to quote President Griswold of Yale<sup>11</sup>

At any one time in this country between the years 1900 and 1950 there are (and this would have held true for any month in any year you might have taken the measurement) between ten and thirteen million foreign born with between fifteen and twenty five million children giving a total of between twenty five and thirty-eight million foreign born citizens and their children.

To further confuse one, a similar increase in birth and decrease in death rates occurred during the 60 years of the reign of George III of England, from 1760 to 1820, when the population of Great Britain doubled. And this occurred in a small land area during a period of emigration rather than immigration. Those were the early years of the industrial revolution and, although there were some general improvements in living, the only significant purposeful medical development was the introduction of vaccination against smallpox by Dr. Edward Jenner at the very end of the eighteenth century. Except for this, forward steps in preventive medicine were almost nil. Fortunately, however, and this may have been a real contributing factor, the plague which was prevalent in England in the fourteenth to seventeenth centuries had not reappeared in epidemic form since 1665.

During the years since World War II there has been an extraordinary demand for trained skills, an increase in the old and development of new ones. Consider if you will what has happened: the great expansion in our automobile, aircraft, and air conditioning and electric appliance industries. To these we have added television, radar and electronics and our nuclear industries and research. Likewise, as you know, research has expanded enormously so that in 1952 it was estimated that 175,000 persons in this country were engaged in research, with an annual expenditure of about three and one half billion dollars. From the medical standpoint alone, our total costs today are in the neighborhood of two hundred million dollars annually. In 1940 the Federal Government contributed twenty five thousand dollars a year to the medical schools, whereas in 1954 its contribution was in the vicinity of fifty million dollars. We have to ask ourselves what price research, yet constantly new avenues are opened which must be followed, first, for their own intrinsic worth, and second, because they in turn lead to new sources of information. It may be wrong, therefore, to accept the conclusion that as long as our group of medical graduates is increasing at a slightly greater rate than that of the general population, all is well, our

apparent and real shortages may not be entirely a matter of distribution

In order to produce 2 800 qualified aviation cadets with two years or more of college education an original pool of 800,000 young men is required By the time those potential pilots reach the age of 40 the number of those remaining in the service is still further reduced

### THE PROBLEM

Today aviation is confronted with problems such as man has never had to cope with before Lacking the emotional drive which existed in the war years a decade ago, has there been a letdown on our part which accentuates those problems in their stark reality?

I have mentioned the series of fatal aircraft accidents that occurred in a recent month, in almost all of which there was no mention of a weather factor In a recent review of acceleration and human performance Brown and Lechner<sup>2</sup> cited as follows

Blockley has distinguished between two kinds of protection which must be afforded pilots One he labels emergency protection This is the kind of protection which is necessary for the preservation of life It would include such items as oxygen supply for use in high altitude a method of pressurization for use in extremely high altitudes and ejection devices The second kind of protection he calls basic protection This includes all techniques and devices for the maintenance and improvement of pilot efficiency Actually with the present rate of development in aircraft Blockley's basic protection is becoming more and more important for the preservation of life The demands which are imposed on pilots are such that unless they can maintain performance at the highest possible efficiency their chances of survival are appreciably diminished This is attested indirectly at least by the high percentage of aircraft accidents which are attributed to pilot error

According to Stieglitz Pilot error is the most common cause of accidents

And Roscoe reports Some pilot error exists in approximately 90 per cent of all aircraft accidents It would seem that the efficiency of pilot performance has not kept pace with the increasing demands as aircraft are improved

The knowledge of these demands is common to all of you, and as you accept "pilot error" the solution of the problem falls largely on the shoulders of the medical profession and its paramedical groups and this includes first-class leadership and strict enforcement of regulations for our pilot personnel

As we enter the zone of sonic and supersonic speeds in the upper stratosphere the demands on that human organism known

as a pilot are almost beyond the realm of imagination. What the laity and those of the medical profession like myself, who are ill versed in these matters, take for granted are the problems which you and those engaged in those disciplines, known as human factors and environmental engineering, are trying to solve.

To pinpoint my thesis that there are simple precautions that we can take to improve our safety record, let me relate three episodes that have come to light. The first appeared in a service publication in a recent letter<sup>2</sup> from the commander to a major subordinate commander.

Reference is made to — Regulation 160 109 28 August 1952 Medical Investigations of Aircraft Accident. It is noted that the provisions of this directive were not complied with in connection with this as well as other undetermined fatal accidents involving — aircraft. Since the primary reason for investigating and reporting aircraft accidents is to determine the cause, and prevent recurrence of similar types, it is requested that all base commanders under your jurisdiction be advised of the importance of insuring compliance with this regulation.

Why should situations like this arise? Are we dropping our guard?

Another report<sup>1</sup> tells of an aircraft accident in which the fundamental cause was considered to be "supervisory error."

This accident was due to lack of appropriate action prior to the accident in connection with the condition of the senior mobile control officer. He was not present for duty and had the only pair of binoculars with him so that the junior mobile control officer was unable to note an unsafe condition of the nose wheel and notify the pilot. Medical information as to the senior mobile control officer revealed that he was hospitalized on that same day with an admission diagnosis of "alcoholism chronic moderate manifested by delirium tremens stress unknown moderate predisposition with long standing history of alcoholism marked impairment." This officer was returned to flying status a few days later by his flight surgeon.

Third is an anonymous case report,<sup>11</sup> service and country not stated, in which a medical investigation of a fatal jet accident by a junior medical officer revealed as follows:

The dead pilot had trouble throughout his course of training and had just made the grade. Basically he was afraid of jet flying but was more afraid of admitting his fear; therefore he had just squeaked by. The morning of his fatal accident he arose with a bad hangover, vomited, ate no breakfast and reported for his formation flight. There was no medical check at that time. Further investigation revealed that he was frequently subject to screaming nightmares and in order to avoid these would often resort to excess alcohol and go to bed moderately drunk.



This was his usual solace at the end of his day's flying. Result was loss of life, loss of an aircraft, impaired morale of his whole outfit. The problem was solved too late by investigation by a young medical officer; it could have been prevented.

You are all aware of the two unfortunate *Comet* disasters over the Mediterranean. Do all of you know that the etiology of these disasters was solved by an extraordinarily fine exhibition of medical intelligence or detective work if you will. The medical findings were reported recently in the *Lancet*,<sup>1</sup> but unfortunately this truly beautiful and complete work was scarcely noticed in the American medical press. An almost identical account,<sup>2</sup> however, was printed in this country in a popular magazine in August, 1955. The first clue was gained by autopsies on the victims of the first accident. There it was found that all of the bodies exhibited unmistakable pathological evidence of explosive decompression. In order to verify this, animals were carried to the same height and explosively decompressed at an altitude of 30,000 feet. The pathological findings were identical. As you will recall, the fragments of the aircraft were dredged from the bottom of the Mediterranean, reconstructed, and the weakened area found above one of the windows at a seam which had blown out when the airplane reached the height of 30,000 feet.

### METHODS OF SOLUTION

What are we doing about these problems in the Department of Defense at the present time?

First, under the leadership, guidance and inspiration of Wing Commander E. Bruce Harvey, RAF, Wing Commander R. T. Lowry, RCAF, and Dr. Howard T. Karsner, advisor in medical research for the Navy, an international Joint Committee on Aviation Pathology has been established by Great Britain, Canada, and the United States.<sup>3</sup> It was my privilege to attend the first meeting which was held recently at the Armed Forces Institute of Pathology. Realizing what pathology had accomplished in furnishing the first clue as to the cause of the *Comet* failures, this committee will establish procedures for and accumulate material from the bodies of the victims in fatal accidents. This may include chemical analyses of blood or tissues, autopsies and histological examination of tissues, and medical examination of equipment and portions of the aircraft. We hope that other countries, as they may be interested, will co-operate with this committee and that our own Civil Aeronautics Administration may participate as they may be inclined to do so.

Second, for several years we have been sponsoring a program called Medical Education for National Defense, commonly known

as MEND. The origin of this program was in the committee appointed by the Association of American Medical Colleges in 1951. At first a test program was inaugurated in five medical schools, which met with a certain amount of success. Objections, however, were raised by the deans of a number of schools that attempts were being made to dictate portions of their curricula, this was considered to be unwarranted interference. In order to eliminate these objections, the program was reoriented two years ago, placed in the hands of a full time administrator and offered to ten additional schools, on their own application, with the provision that an increased number of schools would be added each year as they desired and within the means of the funds provided.

At the present time there are twenty five medical schools participating in this program. Only the faculties of the schools are involved. An organizer is appointed for each school and conferences are arranged in Washington and also in the field for the faculty members participating so that the problems of military medicine may be seen at first hand. The same faculty members do not necessarily participate in each trip but a selection is made so that each special group will be able to visit in its own discipline. Several trips or conferences are provided each year. In this manner the entire research and teaching programs of the military are made available to faculty members of our medical schools. It then rests with them how much they wish to incorporate into their courses. At the present time this program has created marked enthusiasm, as a matter of fact, more than we can keep pace with. We are already planning to include some of the dental schools and expect that some of the products of MEND will be passed on to paramedical groups through the medical and dental schools. In this manner we hope to imbue our new medical graduates with the seriousness and importance of the difficulties and various problems of necessary research which confront aviation today.

Third, the pattern of aviation is ever changing and to meet these growing demands some of our universities, both here and abroad, have instituted programs dealing with these problems. Notable among these is the well planned and complete course in aviation medicine recently instituted at the Harvard School of Public Health under Dr. Ross A. McFarland. Similar attention, though in more abbreviated form, is being given to this growing and important specialty in the College of Medicine of Ohio State University, at Johns Hopkins and at the University of California, Los Angeles, both in postgraduate and medical departments. These are in addition to the increasing growth and application of purely scientific knowledge in our great technical institutes. In addition to these there is the Flying Physicians Association, the aims of which are

interested because their job was on the flight line with aviation personnel

Whether in military or civilian aviation the flight surgeon must be a devoted, courageous, interested, first class doctor and psychologist, and also a man among his fellows. He must know and be willing to fly with each and every pilot under his charge and should have equally intimate knowledge of other members of the air crews. He must have full knowledge of them as individuals of their personalities and of their families. He must be responsible for their physical and mental fitness at all times, which includes their diet, living quarters and recreation. With aviation of today and tomorrow demanding more and more of its human component it becomes incumbent upon the doctor to assure the physical and mental fitness of those in his charge at all times. Likewise his responsibilities extend further than just the pilot and co pilot they extend to all members of the crew and also to the maintenance group who contribute to the mechanical safety of the flight. The flight surgeon is likewise responsible for a large investment of human research capital and material and the lives of passengers entrusted to the charge of the aircraft commander in flight. By flying with his pilots the doctor may discover perhaps the reasons for bravado, uncertainty and indecision. In turn he must have the courage and firmness to recommend grounding a pilot or crew member when in his opinion they are not fit to fly a particular mission. This may require real courage to stand against both pilot and commanding officer or between them.

### CIVIL AVIATION

There is a different aspect to commercial and airline flying. Whereas in military aviation the pilot is ordered to fly and may desire to fly in civilian aviation it is his right to fly according to the terms of his employment. Furthermore in civilian aviation the pilots are less under the guidance of flight surgeons than in military aviation. They and their families are a part of the community and in most instances have their own private physicians. The physician responsible for their fitness to fly, the safety of the passengers and the safety of the plane must extend his knowledge and tact in other directions. As in the military he should know each one of his pilots their personalities their families and their problems. When his suspicions are aroused that something is amiss or when the pilot is ill, he must know how to enter the family situation and cooperate with the family physician who may know nothing whatsoever about the problems of aviation medicine. Here the art and ethics of the practice of medicine enter to their highest degree. If he and the family physician agree then the problem is solved, if however a difference

of opinion arises, he must persuade the family physician of the necessity of a consultation with one or more specialists highly regarded in the profession and of unimpeachable integrity. Furthermore, on his own panel he must have available recognized specialists in the basic sciences as well as in all the specialties of clinical medicine. In the annual physical examinations or in examinations prior to the return to duty following an illness, there must be available every modern device for examination and testing. In civilian aviation this becomes particularly important now as we are about to shift to jet transports with in the next few years. It is needless for me to tell you that this will mean new training programs for the great majority of our airline pilots, not to mention the necessary changes in many of our airports and in operational concepts.

Whereas in 1954 there were slightly over thirty two million paying airline passengers, it is expected that by 1960 there will be fifty five million, with paying passenger miles almost doubled. This will mean not only additional pilots, but also additional flight surgeons.

It is good to see the increased emphasis on civil aviation medicine in the United States. The latest manifestation of this interest is the recently introduced bill (H. R. 10228), known as the Civil Aviation Medical Act of 1956, which provides for an Office of Civil Aviation Medicine within the framework of the Civil Aeronautics Administration, with a civil air surgeon and a Civil Aeronautics Medical Research Laboratory. In effect, these will be the civilian counterparts of offices and institutions found in the Armed Forces.

As planes become larger and speedier, and as the airways and airports become increasingly crowded, unless more and better controls are instituted, the fatality rate may well increase. More and more is required of the pilot. His instrument panel may grow larger and more complex. Every automatic device tends to decrease his sense of feel and his need to see. Unfortunately, however, with every automatic device there is ever present the possibility of failure, and with each added automatic check that is imposed to decrease that chance of failure, another possibility of failure arises, we can never get away from human error. It becomes our duty, therefore, to reduce both human and mechanical errors to a minimum.

### HUMAN FACTORS TEAMS

Here we come to another important factor in accomplishing this. I am sure that all of you have had difficulty at one time or another in repairing some relatively simple part of your automobile engine, maybe perhaps just replacing a nut or bolt, and

in so doing you have appreciated an inexplicable difficulty as to why that nut or bolt could not have been placed more conveniently or why perhaps did it have to be of a size or shape that could not be replaced readily. And if you have not had this experience yourself, you must have heard the cursing and muttering of various repairmen, and the suggestion that it would be a good idea if the engineers that designed the cars and their engines to catch the eyes of the public would spend more time in repairing them. So with the airplane.

When the former Research and Development Board was instituted, a committee of human relations and one of medical sciences were established. At times they overlapped and conflicted but their individual importance and cooperation were well recognized. Since then the military has developed human factors research teams,<sup>18</sup> consisting of a team captain, a flight surgeon, an anthropologist, a physiologist, a psychologist and a biophysicist. These teams work with the engineers in planning the design of airplanes with the result "that significant improvements for crew effectiveness have been accomplished in the B 47, B 52 and F 86 type aircraft through the combined efforts of the human factors teams and contractor and operational commands, at the same time that orderly integration has gone into the future systems."<sup>19</sup> Without the knowledge, thought and planning of these human factors teams it would be impossible for some of our planes to be operated with any degree of safety. They consider, for example, such problems as

- 1 The optimum number and type of crew to perform the mission and the general operational requirement
- 2 Are the altitudes required compatible with weight and space allocation from the environmental control required to provide for 100 per cent mission coverages?
- 3 For the predicted size and shape of the airplane will adequate work space be available for the crew?
- 4 Can an emergency escape configuration be provided equally to all crew members which will meet all predicted speeds, accelerations and altitudes of the aircraft?
- 5 Does the mission require of the system a human ability or skill with no previous counterpart in air operations? If additional skills will be required of the crew members what methods need be developed to provide the training in these skills?

### CONCLUSION

These are the problems that confront jointly aviation and the medical profession today. That there will be a solution, we may be sure. This cannot be done, however, either by aviation or a

new board of aviation medicine alone. It needs the interest and appreciation of these tremendous problems by the entire medical profession and the gradual institution and extension of postgraduate courses in aviation medicine similar to the recently developed in the Harvard School of Public Health. We must interest more young physicians in the problems of and satisfactions in careers in aviation medicine, and in the need for vigorous programs of preventive aviation medicine.

Human control of flight can be successful and acceptable so long as we recognize man for what he is—a human being—then engineer and operate accordingly. There is only one way to achieve fundamental safety in flight—eliminate the exposure.<sup>1</sup>

#### REFERENCES

- 1 Anon. Aviation: what's the weak link? *Know the Facts* 7: 5, 1956.
- 2 Anon. Medical investigation of aircraft accident. *FAA Command Surgeon Newsletter* 2: 7, 1956.
- 3 Anon. Progress in aviation pathology. *J. Aviation Med.* 27: 1, 1956.
- 4 Anon. Some figures that startle the Cabinet. *U. S. News and World Report* 40: 102, 1956.
- 5 Anon. Where was the liable surgeon? *FAA Command Surgeon Newsletter* 2: 7, 1956.
- 6 Alexander L. The treatment of shock from prolonged exposure to cold especially in water. Combined Intelligence Objectives Sub-Committee G-2 Division II, SIIAEF (Rear) Target No. 24, 1945.
- 7 Armstrong J. A., Fryer D. I., Stewart W. K., and Whittingham H. E. Interpretation of injuries in the Comet disasters. *Lancet* No. 6875: 1135, 1955.
- 8 Brown J. L. and Lechner M. Acceleration and human performance: a survey of research. *J. Aviation Med.* 27: 32, 1956.
- 9 Christenson C. M. Viewpoint of the commercial transport pilot. In *Symposium on Frontiers of Man-Controlled Flight*. Los Angeles: University of California Institute of Transportation and Traffic Engineering, 1953, p. 60.
- 10 Flickinger D. Crew effectiveness in the B-52 strategic bomber: planning by human factor teams. *J. Aviation Med.* 26: 2, 1955.
- 11 Griswold A. W. The practical value of a liberal education. *Phillips Exeter Bull.* (suppl.) 50: 3, 1954.
- 12 Lecler R. The great Comet mystery. *True* 35: 34, 1955.
- 13 Moseley H. G. Personal communication.

#### DIAGNOSIS OF ACUTE MYOCARDIAL INFARCTION

"The finding of a normal eosinophil count in the period from 5 to 48 hours following an attack suspected to be acute myocardial infarction, very strongly contradicts the diagnosis."

—KNUT MIRKEBY, M.D.  
in *American Journal of M.*  
p. 55, July 1956

# A TECHNIC FOR MILITARY DELINQUENCY MANAGEMENT

## 1 The Problem and the Program

BRUCE L. BUSHARD *Lieutenant Colonel MC USA*  
ARNOLD W. DAHLGREN *Major MPC USAR*

A NEED exists on every Army post for a smoothly functioning approach to the evaluation, retraining, and disposition of prisoners in the post stockade. Although the post commander is assigned such responsibilities<sup>1</sup> he is not provided with the same type of special staff for their fulfillment as is the disciplinary barracks commander. This is so despite the fact that over one half of all prisoners in custody in the United States Army are under jurisdiction of post commanders.<sup>2</sup> This article describes a manner in which these missions have been accomplished at one large Army basic training center without utilizing any additional staff. It appears practicable from this experience for the Mental Hygiene Consultation Service (MHCS) to be assigned an active responsibility in the fulfillment of these missions. Active co-operation between command, the stockade, and the MHCS has made possible the achievement of unusually favorable results.

Except where specific comment to the contrary is made, the account which follows is based upon experiences and occurrences at one post during a relatively circumscribed period of time. These experiences cannot then be regarded as necessarily typical of military posts at large. It does, however, appear to us that the philosophy and techniques of operation are of value to and may be employed in other situations.

### THE PROBLEM

Confinement of personnel of the United States Army is at a rate of approximately 10 to 12 for each 1,000 persons on active duty. Of this number, 5 to 7 are in post stockades.<sup>3</sup> This constitutes then for command, a substantial sociologic and morale problem. Sixty-five operating, administrative and clerical per-

---

<sup>1</sup> Ft. M. Prof. 510 al D1 510. Office of The Surgeon General Department of the Army  
Washington 25 D. C. and Fort Dix N. J.





In recent years the punishment in military prisons has gone little beyond the discomforts and inconveniences involved in separation from loved ones, sexual deprivation mental (rarely very hard) labor, and lack of freedom. These uncomfortable measures are perhaps better described as annoyances than as punishments. Prisons are usually adequately heated. Beds are reasonably comfortable. Sanitation and opportunities for personal hygiene are frequently better than that to which some of the inmates have been accustomed in their former life. The "rock pile" has been replaced by industrial work with which most prisoners are familiar and which is rarely foreign to many nonprisoners in the population. The food is usually comparable in quality and quantity to that of the average citizen. In military prisons, the ration is the same as that normally issued to the soldier.<sup>12</sup> Medical care is standard and easily available while opportunities for education, socialization, and some recreation are relatively abundant. In general, in prison the lock step, the degradation, and the stony silence of former years have almost disappeared. It is unlikely that society would allow retrogression even if individuals capable of imposing it could be located. Persons capable of successful imposition of any great increase in discomfort are more likely to be found among the imprisoned than among the free population.<sup>13</sup>

In military prisons, the means of punishing prisoners who have committed offenses within prison walls are equally restricted. While the opportunity to segregate such a person and restrict the "tastiness" of his diet remains, the diet must be of adequate caloric value. Such a prisoner must be medically examined daily and cannot be physically abused.<sup>14</sup> This latter has been true at least officially since publication of *The Military Laws and Rules and Regulations for the Armies of the United States* on 1 May 1813.<sup>15</sup>

In many prisons and especially in military prisons, the attitude and behavior of custodial staffs has undergone a similar evolution. They have frequently learned to behave with the detachment and easy tolerance of social workers. They have learned to ignore verbal assault, no longer respond violently to anger and now tend only to protect themselves from actual physical assault. They look upon their charges as essentially ill and frequently demonstrate a definite skill in treating them, although their skill is one which is more likely to secure immediate compliance and co-operation than long term recovery from the delinquent state. Custodians are less obsessively security minded and are more willing to "take a chance" in the form of recommending clemency, parole and trustee status. Frequently, they encounter resistance to their ideas both in the administration

and among an angry or frightened population. They are acutely aware that while to "throw him in jail" may limit the trouble to within the prison walls it usually produces more, not less, trouble.

The study reported here is based upon a 2 1/2 year experience during which the Mental Hygiene Consultation Service became a continuous, co operating, assisting agency in a stockade operation. It provides a history of the development of this technique and proposes a *modus operandi*. Although it is not necessarily the best which might be developed, it does appear to have value. During the period of this operation, the recidivism rate has fallen, the number of disturbances has diminished, and the management of the psychiatric workload has become an easily handled flow rather than a spotty difficult problem accentuated by many emergencies.

In addition to improvement in those areas which lend themselves to statistical study, there has been a change in attitude, an improvement in motivation and morale, and an increased conviction on the part of all persons who participate that "at least something is being done." Stockade duty has become less onerous and stockade cases have ceased to appear so hopeless to examining psychiatrists.

#### HISTORY OF EVENTS LEADING TO REORGANIZATION

The Mental Hygiene Consultation Service has had, from its inception, some type of relationship to the stockade. At times various programs were established for short periods, but these rarely included the total prisoner population and never represented a real, co operative, combined effort with both command and psychiatric personnel participating. The custodial and psychiatric staffs never previously established an integrated working relationship. The programs themselves were not so much "prison psychiatry" as simply psychiatric study within prison walls. Results, therefore, had not been impressive.

The stockade itself is not usually a central concern of a military commander. Especially on a basic training post, it is a sort of "backwater," for the commander is aware that the military potential of the inmates is generally low. His time and energy are directed primarily at the training of nondelinquent individuals who present a good many problem themselves.

Persons who are confined no longer participate in basic training and are, for this reason, transferred out of their basic unit into a "replacement company." This company is also the official unit of apprehended individuals from other Army areas, deserters, and any other person who for any reason—frequently nondelin-

quent—does not participate in training. The delinquent thus ceases to be a part of an organization in which he is known. His former commander has neither responsibility for nor interest in him. The commander of the replacement company does not even see him. He is of interest to and is known by the confinement officer and his staff alone.

For MICS purposes the group might be defined as a screened collection of individuals of poor military adaptation potential. There is rarely basis for speculation on this score, little likelihood that others will argue about it, and no subtlety in the situation requiring extensive screening by MICS. It is, then, an area in which this service can operate inexpensively, depending upon normal social procedures and other agencies to do the initial screening. Further, the MICS is unable to avoid almost continuous contact with this group, for they are referred in large numbers by command to the dispensary, and for pretrial evaluation. Regardless of planning, a substantial portion of their effort is, for these reasons, directed at this group. When the prisoners are seen at MICS proper, it is not uncommon to have three or four armed guards and an equal number of prisoners sitting about the waiting room. This, to be sure, does not create an ultimately desirable experience for the nondelinquent youthful trainees who also share the waiting room. If the prisoner attempts to escape, a series of incidents will arise with which a medical installation is not prepared to cope. At times the guards insist upon exercising their right to remain with their prisoners even during the psychiatric interview and consequently make examination impossible.

In view of these factors, the stockade at this post was, in 1954, a serious problem area. The prisoners were sullen and uncooperative; the population was large, running at about 18 per 1,000 troops; and the number in disciplinary segregation was high, being at times 10.4 per 100 prisoners. Prisoners with two or more convictions accounted for 30 per cent of the population, and the number of persons with three or more convictions was substantial. Finally, individual and organized rebellion was a frequent occurrence requiring the attention of the post commander.

This culminated, in the fall of 1954, in a major disturbance in the course of which nearly all order was lost and the custodial personnel were driven from a section of the stockade. Even an effort by the commanding general himself to quell the riot was unsuccessful and he was nearly injured when rocks were thrown at him. The situation was comparable to that at San Quentin prison in 1939.<sup>4</sup>

When order was restored and the guard complement augmented, an over-all reorganization of the system of handling delinquents was directed. Certain of the custodial personnel were replaced

and a more understanding yet more firm attitude was initiated and maintained. An especially mature officer was appointed confinement officer.

Investigators were appointed to screen the population and to recommend action to be taken in individual cases. These officers found problems abounding in the population. There were persons who had as many as seven prior convictions. Some had literally never served an honorable day, and there were many more whose total honorable service fell below 10 per cent of their total service. There was no established way to expedite the elimination of narcotic addicts, alcoholics, or homosexuals whose very presence serves as a aidus for disruption, temptation, and disorder in any prison.<sup>11</sup> Although the mass of the sentenced prisoners were in confinement for minor offenses, many of them were so antisocial that a prison of less than maximum security represented more nearly a challenge for escape attempts than a reliable means for retention. They were literally "big time operators" in a confinement facility designed to restrain only the minor offender. Not only were they a direct source of disciplinary problems, but they were uncommonly capable of leading others astray and organizing concerted efforts at resistance to authority. A persistently uncooperative or delinquent trainee must be removed from his company and disciplined. Although this solves the problem on the company level, it does not do so for the post, and really represents the beginnings for the search for a solution and not the end. It became clear to the investigators that a means of handling these individuals must be developed and that it must be at a post level.

### THE PATTERN OF THE REORGANIZATION

The reorganization directed was accomplished through the establishment of three routines.

1. A post level agency was delegated the responsibility to convene a board of officers, under the provisions of an appropriate regulation to consider discharge from the service for all individuals following their third conviction by court-martial. This agency, in this case designated Post Investigations,<sup>12-14</sup> also hears other cases upon the recommendation of unit commanders, the confinement officer, or the MHCS. Through liaison with the stockade, these cases are heard not less than one month before the completion of the sentence. Processing takes place in such a way that completion of sentence and discharge from the service, if approved, are coincident. This averts the problem that arises from the fact that many of those people will not remain on the post long enough to be discharged after release from confinement. This is one of the predominant factors leading to repeated and obviously pointless and expensive trial by court-martial.

2 The confinement officer was to institute rehabilitative programs

a All employable prisoners were to be given work with which they were familiar or were to learn new, employable skills of value to the military. Their use in pointless menial labor was to be avoided. Shops were started for their employment in painting signs, repairing targets, and other menial but not degrading work. Authority to establish a shop for the repair of tentage and other such field equipment was requested and the permission was granted. This shop is under the technical supervision of the post quartermaster.<sup>19</sup>

b Mature attitudes were to be maintained. Military discipline was to be used in its constructive sense toward rehabilitation and not in a merely punitive manner, for "brutality and lax discipline go hand in hand."<sup>20 21</sup>

c A rehabilitation company was established. This is a minimum security portion of the stockade located outside of prison walls with prisoners in parolee status. A board consisting of the commanding officer of the prisoner battalion, the stockade chaplain, and a member of MICS was appointed and designated the Classification Board. Any sentenced prisoner may upon the recommendation of MICS, appear before that board. He is eligible for assignment to this company upon the recommendation of the board and upon the approval of the confinement officer. The decision is based upon the prisoner's behavior and his apparent rehabilitative potential. While in the rehabilitation company, the prisoner completes his training by being attached during appropriate hours to a unit in the proper phase of training. If he is not a trainee, he becomes available for other work.<sup>22 23 24 25</sup>

d The clemency system was enhanced. A board of officers, designated the Clemency Board, was appointed. It consists of a member of the line (usually the president), a member from The Judge Advocate General section, one from The Adjutant General section, the stockade chaplain, and a member of the MICS. This board may recommend suspension of sentence after the prisoner has served between one third and one half of his sentence. This recommendation is dependent upon his behavior, attitude, and rehabilitative potential. Appearance before the Clemency Board is not dependent upon prior assignment to the rehabilitation company.<sup>26 27-28</sup>

e The system of parole was enhanced. Prisoners who can be employed about the post are placed on parolee status when it is reasonable in the judgment of the confinement officer, to do so and they are allowed to go from their place of employment without a guard.<sup>2</sup>

f The custodial personnel remain alert for evidence of the existence of "cliques" and other organized activities in the prisoner group. Suspected leaders are placed in administrative, nonpunitive segregation. Others so segregated are suspected or admitted homosexuals, neophobes, drug addicts, noncommissioned officers, former stockade personnel, persons requiring extensive medical treatment, and others who, in the judgment of the confinement officer, represent a source for or a nidus of disruption, poor morale, or bad discipline.

g Disciplinary segregation and loss of accrued good conduct time are used when and if it becomes necessary, for any reason, to emphasize the punitive aspect of the confinement.

3 The Mental Hygiene Consultation Service enhanced and formalized its relationship to the stockade.

a All prisoners are examined within 14 days after sentence is pronounced. Pretrial examinations are prompt if and when they are requested by the commander or the defense or trial counsels.

b Persons requiring psychotherapy receive it.

c Persons, especially first offenders, likely to benefit from transfer to the rehabilitation company are referred to the Classification Board at the appropriate time.

d Appearance before the Clemency Board is recommended at the appropriate time.

e Negative recommendations are made regarding both clemency and transfer to the rehabilitation company, if, for any reason, these appear inappropriate.

f Close liaison is maintained with the confinement officer in finding mutually agreed to solutions for such problems as tantrums, suicidal gestures, suspected psychosis, evidence of organized resistance, cliques, et cetera.

g When rehabilitative efforts have been attempted and significant evidence of their lack of success has been amassed, positive recommendations for separation from the service are made.

(1) All persons whose records reveal three or more courts martial are recommended for appearance before a board of officers convened under provisions of Army Regulation 635-208<sup>23</sup> or Army Regulation 635-209<sup>24</sup>. If the examiner is of the opinion that, for some special reason, retention is in order, he may so recommend to the board. However, he does not seek to prevent the actual appearance before the board. This assures that all such cases are subject to mature command consideration.

(2) The MHCS remains conservative in recommending separation for persons with fewer than three convictions on record. It is regarded as unlikely that such persons, whatever their verbal attitudes, have been offered the full effort of rehabilitation.

(3) Any person, whatever his number of courts martial, in whose case there is reasonable evidence of homosexuality, alcoholism or drug addiction is recommended for separation under the appropriate regulation. Remission of sentence in order to expedite discharge is also recommended. Evidence of such activities is obtained not only from interview with the prisoner, but from operating personnel as well. This is not to say that mere willingness to confess such activities necessarily leads to any official action. Reasonably acceptable collateral evidence is required lest such confessions be used by great numbers merely to achieve an early release. The Command is also willing to entertain a recommendation for remission of sentence and expeditious separation from the service in other selected cases when interview or the record suggests that antisocial or organizing tendencies are beyond the capacity of the stockade to control.

The procedures authorized, then, were so constructed that command was assured that no individual would in effect get "lost" and simply stay on indefinitely neither being disposed of definitively nor rendering meaningful service. It can be seen that MHCS occupies a central position being the initiating agency in much of this program. It also soon became evident that this is the only agency which has sufficient contact with the individual to make meaningful recommendations. It is, in addition, possible for this agency to remain somewhat more objective about an individual prisoner since members of the MHCS do not have immediate responsibility for him. The reviewing authority can therefore assume that MHCS recommendations are more detached and moderate than might be those of others and for this reason, more readily place reliance upon them.

### THEORY OF OPERATION

The nature of military justice is such that persons entering confinement are rarely true first offenders. Examination of the history of an individual confinee will ordinarily reveal that his earliest offenses, if purely military, were first overlooked and later dealt with through Article 15 Uniform Code of Military Justice. His first sentence to confinement is usually suspended. In the main, the confinee has been offered both extensive counseling by various agencies and a good deal of "easy" or "gentle" disciplining. Simple advice or forgiveness has been proven to have insufficient impact to lead to improved behavior. Nor have

the usual treatment techniques ordinarily available through psychiatric agencies had a significant effect on this problem.<sup>28</sup>

From the prisoner's point of view, the situation is hopeless. He either consciously rejects his military obligation or, if he accepts it, has found some reason for not fulfilling it. He expresses the opinion that he must take care of his mother, or his wife, or the family business, or he has some other excuse. In erecting such a rationalization, he finds both an excuse for his misbehavior and a basis for anger at the Army because it does not take the necessary action to return him to his home. Angry when first confined, he is then most resistant to any type of rehabilitative effort.

From the commander's point of view, the problem is also great. This is a man who, despite frequent offers of special consideration, continues to behave in an angry, inflammatory, and insubordinate manner. His behavior has been and is such as to impugn military order and destroy discipline. Concomitantly, his impact upon the discipline and attitude of others who have not yet indulged in such florid behavior seems great. The commander, therefore, is forced to assume that if he continues to tolerate this individual's misbehavior, others will follow suit. The officer who has contact with such an individual almost certainly becomes angry, and often allows his attitude to become one in which desire to "show this guy a thing or two" becomes a factor.

Thus, by the time a soldier has been confined, both he and the individuals dealing with him have sometimes lost their perspective so completely that the situation is not an impasse. The prisoner behaves in a manner which serves him poorly, and the individuals who deal with him have allowed their emotions to control the situation to the degree that they accomplish little save to give the prisoner a good excuse for his anger.<sup>29</sup>

The outcome of this situation varies, but there is a common and readily observable pattern. This is primarily based upon the simple fact that the prisoner's anger usually causes trouble to no one but himself. He batters his head against a wall not so much made of stone as of a material that is not only unyielding but uncaring. Unless he is able to organize with others in such a way as to bring discomfort to the organization through his anger, he simply compounds his situation.<sup>30</sup> Nevertheless, some 30 per cent of prisoners indulge in some type of ill disciplined behavior during the first six weeks of confinement.

At a period that ranges ordinarily between the 30th and 60th day, the average prisoner is least recalcitrant. He is then most amenable to accepting some evidence from authority that it was his behavior which was rejected, not his person. The difference



between his attitude at that point and his attitude when he was first confined may be dramatic. If an observer is sensitive, he will note some effort on the part of the prisoner to achieve some type of nondelinquent acceptance. He sometimes must do this covertly lest he suffer rejection by his fellow prisoners if it becomes evident to them.<sup>10</sup> Nevertheless, he frequently makes some effort in this direction. This might be interpreted as the point at which authority has won the struggle. When this occurs, the prisoner is ready to comply and sometimes merely seeks some way to return to the good graces of authority in a reasonably dignified manner. If, during this period, opportunities are available for parole, clemency, or other procedures in which a degree of acceptance or at least partial trust and forgiveness are implicit, he may be moved away from his identification with delinquency and toward a more meaningful relationship with society. If such procedures are not available, he will ordinarily lapse into a type of apathy, retain or perhaps even intensify his relation with the delinquent group, and become at least, a poor risk for rehabilitation or perhaps even a severe delinquency problem within the stockade itself.

This process may then be described as one in which the prisoner has two models with which to relate and to identify. He may identify with the prisoner group and indulge in the misapprehension that delinquency is a pattern of behavior with social value. On the other hand, he may identify with the custodial group who represent "society" and attempt to emulate their more successful transactions with their environment. Although the first identification is usually with the prisoner group, many prisoners will shift their identifications from one extreme to the other in the manner described. Rehabilitation is derived, then, partly from timing the offering of clemency at the moments when the more acceptable identification is in the ascendancy.

There are, of course, many who do not follow this pattern. Many who do follow it are unable to maintain a satisfactory level of behavior for a protracted period and lapse into delinquent behavior. Statistically the results of such a plan as this are not remarkable, but the efficacy of almost any procedure in handling this type of problem is not great and one must not allow his modest statistics to discourage him.<sup>11</sup> The results of this program compare favorably with those of a long term project in a state penal system which had a 23 per cent incidence of rein carceration.<sup>12</sup> Others have ranged to as high as 60 per cent.<sup>13</sup>

The philosophy which underlies this program can be fairly simply stated. A military delinquent pursues patterns of behavior which consciously seem to him (1) to achieve his immediate desires most directly, (2) are successful in achieving a measure

of social success, and (3) cost him the least.<sup>30-32-34</sup> The treatment program is then designed to ascertain that the outcome is such that each of these aims is better achieved through conformity with normal social values than through nonconformity.<sup>35</sup>

Taking the three projected urges of the delinquent as topic headings, the program is organized as follows

1 **The Delinquent Wishes to Achieve His Immediate Desires as Directly as Possible** Psychiatry refers to the delinquent as suffering from an impulsive character disorder. He has not learned to get the things he wants out of life by careful planning, by working, or by establishing a working relationship with his community. He has not learned to achieve things by his own efforts; he impulsively grabs what he wishes with little planning and little thought of the consequences. Rather than view failure to get what he wants as an indication that he has failed to provide for himself, he blames others. Any maturity he may appear to have is a pseudo maturity in that he has not learned to be a self-sustaining individual. The delinquent then appears to be primarily intent upon short-term goals. Sometimes, on the other hand, his goals are more complex but distorted. An example of this lies in the exaggerated masculinity assumed by some delinquents. Proof of masculinity even at the cost of remarkable physical pain, though not necessarily a short-term goal, is a prime mover of these persons. In other cases, the goal may be obscure or of a profoundly unconscious origin, as in the case of the delinquent whose behavior arises out of a need for or pleasure in punishment. These more complex phenomena sometimes require more extensive types of study and treatment than is here described.<sup>34</sup>

A program for his rehabilitation need not punish his past misbehavior in order to make it sharply evident to him that such behavior has not achieved a great deal for him. Among the requirements is the maintenance of a sharp degree of objectivity on the part of individuals dealing with him. Most of the explanations given for misbehavior are not entirely truthful and some are frank lies. An occasional one is nearly reasonable. Although one cannot believe the explanations, it is of great importance that each be objectively investigated. On the one hand, the objective fact is necessary if one hopes to point out the defects in his story to a given individual. On the other hand, if but one individual has told the truth, is disbelieved, and later is able to show that his mother, for example, has realistically suffered as a result of this disbelief, all other prisoners will have received evidence testifying not to the fact that their behavior accomplishes nothing but rather that they are outcasts about whom no one cares.<sup>35</sup> They will have found a justification for

more not less, misbehavior. Only with real facts can the inappropriateness of misbehavior be brought into a palpable relief.

2 The Behavior Represents an Attempt to Secure Social Success. Nearly all people are bound together by their common interests and each receives support in his individual behavior through such an association. Although the delinquent does not form very competent relationships he seeks it from other delinquents support. Among the reasons he seeks it from other delinquents is his feeling of having been abandoned by conforming people. If the individual has no opportunity as an individual to form some type of relationship with the society he has offended his initial anger will persist and he will quickly find other delinquent individuals to whom to relate. Soon a clique or a group spirit is born in which delinquency is a socially valuable phenomenon. By its unrelenting stand, society has produced a situation which encourages delinquency. A situation has been so structured that the delinquent has no choice but to do the thing he wishes almost automatically to do anyway. That is to find others who feel as he does mutually to resist authority and consequently achieve some feeling of self worth. Under these circumstances the confinement officer finds himself not with a great many individual offenders to deal with but rather with an organized mob over which he has little control.

One attempts to avert this by de-emphasizing the notion that the prisoner is being punished for what he has done and by emphasizing that his future accomplishment depends upon the social value of his conformity. Obviously he must be provided with some kind of acceptable and reasonable dignified opportunity to conform to reasonable activities and socially acceptable restrictions. One must also ascertain that the individual prisoner has more to gain from negotiating with society as an individual than as part of a group. If whatever he does the individual sees no possibility of achieving acceptance he will tend to join a delinquent group. If however, his problem is dealt with in an individual manner and he may get clemency or other special consideration only as an individual the formation of groups will have no real value to the individual and to that degree will be discouraged. Such a program at this must, then be carefully individualized.

3 The Delinquent Seeks to Achieve the End He Feels is Least Cost to Himself. In this regard a punitive aspect of the situation is preserved. It is an economic truism that it is at least potentially more expensive or perhaps more uncomfortable to fail to conform than to conform. Humans will rush to what they think is the least costly type of behavior.

The operation of such a program must be carried out in such a way that if an individual cannot be dissuaded from delinquency, at least it costs him more than conformity to society's demands would. The recalcitrant prisoner must find that he remains behind after the more conforming person has left. No particular behavior pattern which is delinquent and which is designed, at little cost to the individual, simply to force the hands of authority can be allowed to succeed. The most frequently encountered of such activities are suicidal gestures, temper tantrums, and hunger strikes. In such cases, prompt determination must be made as to whether such behavior is the product of a frankly psychotic mental disease. Immediate hospitalization is necessary if such mental disease is present. If not, both the psychiatrist and the stockade staff must have the courage and strength of purpose to deny the prisoner's bid for special attention even though, in the end, such behavior usually will influence one toward a final decision recommending discharge from the service. If and when the individual is to be granted the attainment of the goals which motivated such behavior, this success must come only after the behavior has been abandoned. The hunger striker who returns to the mess hall and the suicide gesturer who is sent back to work serve as marked evidence that such behavior is not valuable. To accord such individuals special treatment tends to enhance the probability of whole epidemics of such behavior. Cooperation between psychiatric and stockade personnel in carrying out this kind of procedure is essential. It might be easier for all concerned to deal differently with an isolated case, but one is then at a loss to know what to do with 10 of them. During the period reported on, there was not a single case of successful suicide in the stockade, even though the population always included two or three people who periodically threatened it.

This program is designed, then, to promote group forces which tend to press individuals toward nondelinquent patterns of behavior. This is accomplished through providing the prisoner group with only that information on which they can predict what will occur if they conform with normal social attitudes and behavior patterns. They must know that if they conform in a proper manner, opportunities exist for eventual restoration to a satisfactory position in society. They must not be able to predict what delinquent singular things they can do or what frightening or threatening statements they can make to secure an early release, special attention, or disorganization of the administration. They are sensitive to ways in which they can remain delinquent and will use these ways if they sense a weakness in the system. They will soon sense the existence of a too rigid policy which, for example, requires that all individuals given to a certain act

be discharged from the service immediately. They will then have information available as to the price they must pay to get out of the stockade or the Army. To deal with each such case on its own merits, tends to produce a sufficiently varied pattern of administrative response so that such an outcome can be avoided and the prisoner group can be deprived of knowledge of such policies even if they exist.

## REFERENCES

- 1 Guardhouses Stockades and Hospital Prison Wards AR 210-188 31 May 1951
- 2 Office of The Provost Marshal Department of the Army
- 3 Statistical Section Comptroller's Office Fort Dix N J
- 4 Zilboorg G The Psychology of the Criminal Act and Punishment. Harcourt Brace & Co Inc New York N Y 1954 pp 27 33
- 5 Scudler K J Prisoners are People Doubleday & Co Inc Garden City N Y 1952 pp 57 13 21
- 6 Lindner R M Stone Walls and Men, Odyssey Press Inc New York N Y 1946, pp 383 398
- 7 Gluck S and Gluck E T Criminal Careers in Retrospect. (Harvard Law School Studies in Criminology) The Commonwealth Fund Division of Publications New York N Y 1943 p 189
- 8 Glin J L Criminology and Penology (Century Social Science Series) Appleton-Century-Crofts Inc New York N Y 1954 pp 335 346 433-446.
- 9 Biggs J The Guilty Mind, Psychiatry and the Law On Homicide Harcourt Brace & Co Inc New York N Y 1955 pp 187 188
- 10 Break at Strat Penitentiary in Walla Walla Washington, Time Magazine 34 18, July 18 1956.
- 11 Duffy C T The San Quentin Story Doubleday & Co Inc Garden City N Y 1950 pp 15 56.
- 12 Guardhouses Stockades and Hospital Prison Wards SR 210-188-1 31 May 1951
- 13 Martin J B Break Down the Walls Ballantine Books Inc New York N Y 1954 pp 173 175 154 182 175 233 234
- 14 Prisoners General Prisoners AR 633 5, 29 Mar 1956
- 15 The Military Laws and Rules and Regulations for the Armies of the United States May 1 1813 Cited in Ganev W A. The History of the United States Army D Appleton Century Co New York N Y 1942 p 129
- 16 Fort Dix Memo No 56 Discharge of Enlisted Personnel UP AR 633 208 ad AR 635 209 dated 12 Apr 1956.
- 17 Fort Dix Letter Subject Elimination of Habitual Offenders dated 26 Apr 1956
- 18 First Army Circular No 8 Elimination of Marginal Personnel dated 5 Sept 1956
- 19 Fort Dix Memo No 235 Prisoner Employment Program dated 17 Dec. 1956
- 20 Accounting Procedure for Prisoners Personal Property and Funds SR 210-185 15 30 Jan 1953
- 21 Fort Dix Memo No 100 Prisoner Rehabilitation Program dated 26 June 1956
- 22 Fort Dix Memo No 189 Standing Operating Procedure of Clemency Board dated 5 Nov 1956
- 23 Restoration of Military Prisoners Sentenced to Confinement and Discharge AR 600-332 24 May 1951
- 24 General Provisions for Discharge and Release AR 6 5 200 6 D c 1955
- 25 Personnel Separations-Discharge-Unsuitable Habits and Traits of Character AR 635 208 21 May 1956
- 26 Personal Separations-Discharge-Unsuitable Habits and Traits of Character Mar 1955
- 27 Uniform Code of Military Justice Part III-Non-Judicial Punishment Art 15 Commanding Officer's non-judicial punishment
- 28 Abrahamson D Crime and the Human Mind. Columbia University Press New York N Y 1944 pp 192-222

- 29 Blomberg W *Crime and the Mind*. J B Lippincott Co Philadelphia Pa 1948 pp 49-52 29 96.
- 30 Redl F and Wineman D *Children Who Hate* The Free Press Chicago Ill 1951 pp 168 141 196
- 31 Rumney J and Murphy J P *Probation and Social Adjustment*. Rutgers University Press New Brunswick N J 1952 p 166
- 32 Wilson D P *My Six Convicts A Psychologist's Three Years in Fort Leavenworth* Rinehart & Co Inc New York N Y 1951
- 33 Glueck S S and Glueck E. *Later Criminal Careers* The Commonwealth Fund Division of Publications New York N Y 1937 pp 62-134
- 34 Alexander F and Staub H *The Criminal the Judge and the Public* Free Press Glencoe Ill 1956 pp 29-57
- 35 Fine B *1 000 000 Delinquents* World Publishing Co New York N Y 1955 pp 110-117

(To be concluded)

---

### SCOLIOSIS

\*Early recognition of scoliosis is possible if the back is examined with the patient bending forward. This should be part of every physical examination in children. Deformity increases most during the period of rapid vertebral growth from 11 to 15 years of age unless it is corrected. The severity of scoliosis is expressed in degrees of angular measure as determined on the roentgenogram. If it exceeds 30 degrees complete restoration is no longer likely to be achieved because the average amount of correction obtained by traction, body casts, and surgical fusion of the affected vertebrae is about 25 degrees. The use of a localizer cast makes it possible to keep the patient ambulatory all the time except for the 7 to 10 days after surgery. The total period of immobilization of the patient's back after operation is 8 to 10 months."

—JOSEPH C. RISSER, M.D.

in *Journal of the American Medical Association*  
p 134, May 11 1957



## Clinicopathologic Conference

U S Naval Hospital Corona Calif

### ABDOMINAL PAIN ANEMIA AND SUDDEN DEATH

**Summary of Clinical History** A 26 year old married white woman had nausea, vomiting, and lower abdominal pain in July 1955 who was told by a physician that she had a bad tubo and needed an operation. She refused the operation, however, and recovered until the onset of the illness requiring her first admission to this hospital.

#### FIRST ADMISSION

The patient was first admitted to this hospital on 14 October 1955. For five days, following a normal menstrual period, she had been experiencing nausea, vomiting, and right lower abdominal pain of increasing severity, which radiated to the back. For two days prior to admission, she had a cough productive of one-half cup of sputum per day. No diarrhea or constipation were present. There was no history of recent sexual intercourse, her husband having been overseas for several months.

At the age of six years she had diphtheria and a tracheostomy. At eight years of age she was suspected of having poliomyelitis. For many years as a child she had frequent nose bleeds, but none in recent years. For several years she had had frequent sore throats and bouts of coughing productive of yellowish sputum. The patient was a heavy smoker. Four years prior to this

Capt Alton C. Abernethy MC, USN Commanding Officer

hospital admission she received a bullet wound of the liver requiring laparotomy, from which she completely recovered. The patient has one child four years of age and has had no miscarriages.

**Physical Examination** The patient was moderately well nourished and of average development. Her blood pressure was 116/68 mm Hg, temperature, 99.6° F, pulse, 88 per min, and respirations, 20 per min. There was increased pigmentation of the skin and mucosa. The patient was a brunette. The nasal and pharyngeal mucosa were congested. The heart, lungs, and breasts were normal. The abdomen was soft, there was tenderness without spasm in the lower abdomen, but none in the flanks. On bimanual pelvic examination there was tenderness, more so on the right side. The cervix was normal, the uterus was small, retroflexed, and in the midline. One examiner noted pain on motion of the cervix, and thickening and tenderness of the sacrouterine ligaments and both adnexa, but no definite masses.

**Laboratory Studies** The urine was normal and had a specific gravity of 1.026. A white blood cell count was 13,150 per  $\mu$ l, with 3 per cent band forms, 71 per cent neutrophils, and 26 per cent lymphocytes. Hemoglobin was 12.8 grams per 100 ml, hematocrit, 37 ml per 100 ml, and red blood cell count, 3,920,000 per  $\mu$ l. The red blood cell indices were mean corpuscular volume (MCV), 99 cu  $\mu$ , mean corpuscular hemoglobin (MCH), 32  $\mu$ g, and mean corpuscular hemoglobin concentration (MCHC), 34 per cent. An antistreptolysin titer was 1:50. A roentgenogram of the abdomen showed normal findings and one of the chest revealed clear lung fields and a cardiac silhouette of normal size and position. An electrocardiogram disclosed normal findings.

**Course in Hospital** The patient was treated with penicillin and streptomycin sulfate. On 15 October she was afebrile and abdominal tenderness was minimal, with no rebound or guarding. On 16 October her abdomen was not tender and she felt well. On 17 October she complained of right suprapubic pain and stated, "The bones of my legs hurt and I can't move on waking in the morning." On 23 October she was afebrile, her abdomen was not tender, and she felt well. Pelvic examination revealed tenderness of the right fallopian tube. She was discharged on the ninth hospital day.

#### FINAL ADMISSION

On 29 October 1955, she returned to the outpatient clinic complaining of shortness of breath, nausea, vomiting, and multiple aches and pains. The shortness of breath was present at rest as well as on exertion. Physical examination of the chest disclosed normal findings except for hyperventilation. Blood pro-



sure was 104/76 mm Hg and pulse, 120 per min. Examination of the abdomen revealed normal findings. It was thought that her symptoms were on an emotional basis and 0.1 mg of Serpasil (brand of reserpine) three times daily was prescribed. On 1 November a neighbor called the hospital to say that the patient was very sick, and she was readmitted.

The patient stated that following discharge from the hospital she had done well for one week. She then began to be short of breath, had fainting spells, and bouts of nausea, vomiting, diarrhea, and abdominal and pelvic pain. She had also become apprehensive. Sometime in the preceding three days she had fainted in her bathroom, striking the left side of her face against the tile. She had some burning on urination, and noted the passage of bright red blood from the vagina when voiding or defecating. She denied the ingestion of any poisons or drugs other than Serpasil.

**Physical Examination.** The patient was acutely ill, pale, markedly dehydrated, slightly cyanotic, and breathing rapidly. Her temperature was 96.4° F rectally, pulse, 80 per min, respirations, 30 per min, and blood pressure, 70/40 mm Hg. There were ecchymoses in the left orbital area and over the right knee. No petechiae were present. The mouth was dry, the tongue was coated and brown, there was no acetone odor to the breath, and no lead line or mucosal burns. The neck was supple. No enlarged lymph nodes were present. The lungs and heart were normal. The abdomen was soft and flat. There was generalized abdominal tenderness on light palpation, more marked in the epigastrium and right upper quadrant. The liver edge was palpable 2 to 3 fingersbreadth below the right costal margin. The patient complained of pain in the knees on movement, and of abdominal pain on movement of the thighs, especially the right. On pelvic examination, the uterus and adnexa were normal and there was little tenderness. Tendon reflexes were somewhat hyperactive, but equal, there were no abnormal reflexes. The left ocular fundus was normal, but the right was not visualized. One observer thought there was slight icterus.

**Laboratory Studies.** The urine was amber and acid, with a specific gravity of 1.022, albumin, 3 plus, normal sugar, and 10 to 15 coarsely granular casts and 8 to 10 white blood cells per high power field. A red blood cell count was 2,540,000 per  $\mu$ l, hemoglobin, 9 grams per 100 ml, and hematocrit, 24 ml per 100 ml. Red blood cell indices were MCV, 94 cu  $\mu$ , MCH, 35  $\mu$ g, and MCHC, 37.5 per cent. A white blood cell count (including nucleated red cells) was 50,000 with 57 per cent neutrophils, 5 per cent band forms, 5 per cent metamyelocytes, 1 per cent myelocytes, 30 per cent lymphocytes, and 1 per cent monocytes. The smear showed 44 normoblasts per 100 white cells. Platelet

count was 300,000 per  $\mu$ l. Coagulation time of venous blood was 3 min 15 sec. The prothrombin time of the patient was 27 sec, control 15 sec. Serum bilirubin was 1 mg direct, 1.0 mg per 100 ml, 3.0 mg direct, 1.6 mg per 100 ml, and 3.0 min total, 4.0 mg per 100 ml.

**Course in Hospital.** The patient was placed in an oxygen tent and 1,000 ml of 5 per cent dextrose in water was given by vein. Her blood type was O positive. A transfusion of cross matched, O positive blood was started at 1810 hours, after the blood specimen for laboratory examinations had been obtained. At 1830, after 100 ml had been administered, the patient screamed for help and went into profound collapse. She was pronounced dead at 1840.

### DISCUSSION

**Doctor Hill:** From a study of the protocol it appears that the patient definitely had a gynecologic problem, and while it may not be the major one, it was a contributing factor in her illness.

The onset of such symptoms following menses often suggests pelvic inflammation, and the history of previous medical examinations further strengthens such a hypothesis. Tubal abortion can mimic most any syndrome of pelvic origin and must be strongly considered despite the menstrual and absence of sexual contact history. The temperature of 99.6° could be present in various types of tubal disease, and the rather negative findings on pelvic examination do not rule out tubal abortion, though they eliminate any marked inflammatory process. The laboratory findings on the first admission are not indicative of any specific abnormality.

Apparently the process responded promptly to antibiotics only to recur six days after discharge from the hospital. The symptoms described at the outpatient visit, plus the rapid pulse, strongly suggest oxygen want; it may have been hemorrhagic in origin, such as is seen with reactivation of tubal abortion when the process is temporarily stayed by adjacent visceral adherence, omental attachment, and the like.

It would have been wiser to readmit the patient to the hospital for further observation and treatment at this point; a posterior colpotomy might have been indicated.

At the second admission to the hospital the record shows that the patient evidently had urgency and had fainted in the bathroom. She had pelvic and abdominal pain, nausea, vomiting, and diarrhea. This to me forcefully intimates pelvic bleeding; a tubal abortion will give almost the identical picture as portrayed. The physical examination elicited some findings characteristic of internal hemorrhage, the gen-

eralized abdominal tenderness plus rather negative pelvic observations by no means eliminated the possibility of tubal bleeding.

The liver enlargement plus marked aberrations of laboratory tests indicate systemic disease whose nature the medical service will attempt to fathom. From the gynecic viewpoint, I am strongly inclined toward the diagnosis of tubal disease and most especially toward a tubal abortion in some phase.

Doctor Fox. In discussing this case I plan to concentrate on the anemia. First, let's review the findings in her blood. During her first admission on 15 October 1955, she had slight leukocytosis with slight increase in the neutrophils. There was a borderline value for the hematocrit. The cell indices were MCV, 99; MCH, 32 and MCHC 34. These values are within the limits of laboratory error. On the second admission, 1 November 1955, she had moderate anemia, the hemoglobin having dropped from 12.3 to 9 grams per 100 ml and the hematocrit from 37 to 24 ml per 100 ml. The indices were MCV 94 MCH 35 and MCHC 37.5. These values were essentially unchanged from the previous ones. In addition the white blood cell count was elevated to 50,000 per  $\mu$ l. 44 per cent of these cells were normoblasts leaving an actual leukocyte count of 28,000. Differential showed 57 per cent neutrophils, 3 per cent bands, 5 per cent juveniles and 1 per cent myelocytes, a total of 67 per cent myeloid cells and a definite shift to the left with immature cells. The platelets were normal. The anemia was moderate in degree and was normocytic and normochromic. Other laboratory tests of immediate concern were the coagulation time, which normal and the prothrombin time which was moderately prolonged, not in the range to cause bleeding. The serum bilirubin was 2.4 per 100 ml indirect, 1.6 mg per 100 ml direct at 30 min. In addition the patient had hepatomegaly but her spleen was not palpable.

I want to start with the consideration of various types of anemias and discuss this case from the standpoint of each of these types. There are four chief types of anemia: (1) deficiency, (2) blood loss, (3) increased destruction, and (4) decreased production of blood cells. *Starting with the first*, I think we can eliminate deficiency as a cause in this case. Iron deficiency causes a microcytic hypochromic anemia whereas  $B_{12}$  and folic acid deficiencies cause a macrocytic anemia. Other causes of deficiency anemia are protein deficiency and possibly vitamin C deficiency, neither of which seems applicable in this case. Experimentally anemia has been produced in animals by deficiency of pyridoxine and other B vitamins but clinically this has not been demonstrated.

Next we can consider anemia due to an acute blood loss. I believe we can make out a good case for this type of anemia in this patient. First there is a history of blood loss from the vagina. The description does not sound like enough blood loss to account for the whole pic-

ture Internal hemorrhage, particularly intraperitoneal hemorrhage, could explain a good deal. The leukocytosis, presence of immature myeloid cells, normal platelet count, and normal clotting time all fit in this category. Indirect bilirubinemia is seen in hemorrhage into the serous cavities due to absorption of the blood pigments. However, the percentage of normoblasts is out of proportion to the degree of anemia. It is my impression that in acute posthemorrhagic anemia the more usual finding is reticulocytosis with perhaps a few normoblasts. Other points against a blood loss anemia are the prolonged prothrombin time and the hepatomegaly.

The third type of anemia is that due to increased destruction of red cells. We have two subgroups here, the first due to intracorpuseular causes. Under this we can list sickle cell anemia, hemoglobin-C disease, thalassemia, familial hemolytic jaundice, nocturnal hemoglobinuria, and others of the abnormal hemoglobin diseases. The patient had no past or family history suggesting any of these and there was no comment as to the presence of spherocytes, sickle cells, or target cells in her blood smear. The second subgroup is the extracorpuseular causes of increased destruction. Under this category come the acquired hemolytic anemias. First we have those acute anemias due to immune body reactions. These include transfusion reactions, the anti-Rh and anti-Kell, and other mixed group transfusion reactions. There are then the cold, warm, and blocking antibody agglutinins, and finally the cold hemolysins causing cold hemoglobinuria.

The second category of hemolytic anemia is the idiopathic hemolytic anemias without demonstrable hemolysins or agglutinins. A third type is secondary or symptomatic hemolytic anemia. This type includes hemolytic anemias secondary to known primary disease. This is most often seen in association with Hodgkin's disease, leukemia, other malignant lymphomas, lupus erythematosus, carcinomatosis, lymphomas, or liver disease.

In the fourth group of hemolytic anemias are those due to infections, in this group we can include malaria, which on a world wide basis is probably the largest cause of hemolytic anemia, and septicemia, especially that due to infection with clostridia, streptococci, and *Escherichia coli*. Finally there is the group of hemolytic anemias caused by chemicals, physical trauma, particularly heat, and vegetable and animal poisons.

In this whole group of hemolytic anemias I think we can eliminate many without further discussion. The possibilities that remain are an acute hemolytic anemia with or without hemolysins or agglutinins, and either idiopathic or secondary. We do not know whether the patient had agglutinins, as no tests were performed for them. It would have been interesting to do tests for cold, warm, and acid agglutinins and to do a Coombs test. I think we can make out a good case for this type of anemia. The indirect bilirubinemia, leukocytosis, immature

myeloid cells normal platelet count and normal clotting time all are compatible

In addition, many items in this patient's history could be due in whole or in part to hemolytic anemia. The pain in her abdomen, pelvis, and extremities, the nausea and vomiting, shock, weakness, dyspnea, and fainting all fit. The lack of splenomegaly is slightly unusual. The prolonged prothrombin time also does not fit a hemolytic anemia. The most important single finding against hemolytic anemia is the number of normoblasts. The same argument holds in this instance as against blood loss anemia. I would expect reticulocytes and a few normoblasts but not 44 per cent normoblasts especially in an anemia which is only moderate in degree.

Considering the possible primary disease with which an acute hemolytic anemia might be associated there is leukemia, and in favor of this we have an elevated white blood cell count but no other real evidence. Hodgkin's disease and malignant lymphoma are possibilities but we have no positive evidence. Liver disease is a possibility, and the patient did have a history of a bullet wound of her liver. However, I don't believe there is any backing in the history for a diagnosis of liver disease. Infections including malaria and septicemia seem unlikely. It is true that the first admission seemed definitely associated with infection in her pelvis but the terminal picture was not that of a septicemia. In regard to lupus erythematosus one point in favor of this diagnosis is that the patient had a puzzling illness which caused her death. However, there is no specific evidence for lupus.

The fourth large category of anemia is that due to decreased production of red cells. The first subgroup here is that of congenital hereditary types under this heading come many of the diseases previously discussed as hemolytic anemias. These include sickle cell anemia, thalassemia, and other hemoglobin diseases. There is decreased production as well as hemolysis in these conditions. Secondly, there is the acquired group of anemias due to decreased production. Again we can list the possible causes of an acquired infection of this type. Infections are a possibility. In every acute infection of any degree of severity there is probably a certain amount of bone marrow depression. However, this does not account for the normoblasts and the immature white cells. Chronic disease such as nephritis can cause an anemia of this type but there is no evidence for nephritis in this case. Terminally the patient had some albuminuria and casts but on her previous admission only two weeks before she had had a normal urinalysis. Other causes are lead intoxication, x-ray irradiation, and chemical toxins. None of these seems operative in this case.

Endocrine disorders such as myxedema and Addison's disease can cause anemia due to decreased production of cells. In consider-

ing Addison's disease it is interesting to note that on the patient's first admission she was found to have increased pigmentation of her skin and mucosa. Then on her final admission she was in a state of shock and prostration which rapidly led to her death. It is interesting to speculate that possibly her terminal illness may have been Addisonian crisis. If her primary illness was tuberculous salpingitis, her Addison's disease could well have had a related cause, this could account for many aspects of the picture. However, I don't believe that Addison's disease explains her anemia, particularly the presence of normoblasts.

Finally, the last category of anemia due to decreased production is myelophthytic anemia. The causes of myelophthytic anemia include leukemia, Hodgkin's disease, and malignant lymphoma, all of which we have mentioned previously and excluded. Myelofibrosis or sclerosis is a possible cause of this type of anemia. It would explain the anemia itself very well but would not, I believe, explain the rest of the history and the laboratory findings. The last possibility is that of malignancy with metastases to the bone marrow. I believe we can make out a very strong case indeed for this type of anemia. The blood picture fits to a "T". There is a leukemoid reaction which has also been called leukoerythroblastosis. There is an elevated white blood cell count with immature myeloid cells. The white count in a leukemoid reaction is not necessarily elevated but the presence of immature cells is constant. The presence of the normoblasts is characteristic. The platelets may be low or may be normal, as they were in this case. Frequently there is pancytopenia as a result of a myelophthytic anemia, but the leukemoid picture is a frequent one. Other points in the case which could fit this type of anemia are the pain which could have been bone pain due to metastases, the hepatomegaly, and prolonged prothrombin time and bilirubinemia which could be explained by liver metastases. The abdominal pain with motion of the legs suggests involvement of the retroperitoneal areas and the psoas muscle by tumor. And again the possibility of Addison's disease arises here due to invasion of the adrenals by tumor.

So to explain the anemia we have three main possibilities: (1) blood loss, (2) hemolytic anemia, and (3) myelophthytic anemia due to metastatic carcinoma. I think the patient probably has all three. There is a definite history of blood loss. Recent studies have shown that there probably is increased red blood cell destruction in most cases of anemia associated with metastatic carcinoma, even though it may not be demonstrable with the usual methods. And finally the third possibility, that of myelophthytic anemia due to metastatic carcinoma, I believe is the chief cause of this patient's anemia.

We then should consider the cause of her sudden death. She died shortly after the start of a transfusion. This immediately suggests that the transfusion had something to do with her death. However, when we analyze this we find that it is rather unlikely. A hemolytic

transfusion reaction which leads to the patient's death usually causes death by anuria due to lower nephron nephrosis. The death is a slow one and not an abrupt one as in this case. A second possibility of causation of her sudden death is embolism and I think this is a very probable cause. The embolus could either have been a tumor embolus or from a venous thrombosis in the pelvis or the legs. I think the suddenness of her death is in favor of this. Bleeding as a cause of her sudden death is a possibility. This would have to be internal and I do not think it can be excluded.

In selecting the site of the primary carcinoma, which we are postulating, we must consider the types of carcinoma which tend to metastasize to the bone. These include carcinoma of the breast, thyroid, stomach, kidneys, bronchus, and colon. An undetected primary lesion in any of these sites is a possibility. However, the patient's symptoms all pointed to her pelvis and her genitourinary tract. Carcinoma of the kidney is a possibility. Carcinoma of the cervix, I think, is ruled out by the physical examination. Carcinoma of the fundus of the uterus, carcinoma of the fallopian tube, and carcinoma of the ovary are all possibilities. She was noted to have tenderness of the right fallopian tube, so I will place the site of the primary there.

In summary then she had carcinoma arising in her genital organs, probably the right fallopian tube, with metastases to the liver and bone marrow. She had myelophthitic anemia due to bone marrow metastases. The terminal event was probably pulmonary embolism from a pelvic vein thrombosis.

Dr Hill's diagnosis

Tubal abortion

Dr Fox's diagnoses

- 1 Carcinoma of right fallopian tube, with metastases to liver and bone marrow
- 2 Myelophthitic anemia
- 3 Pulmonary embolism from pelvic venous thrombosis

#### PATHOLOGIC FINDINGS

Doctor Fuller. Post mortem examination of the body revealed skin ecchymoses around the left eye, over the right knee and right leg on the left buttock, and around needle puncture marks in the arms. There was icterus of the conjunctivas, the endothelium of the heart and blood vessels was stained pink. Blood was present in the endometrial cavity and vagina. A moderate amount of fatty material was present in the lower small intestine and colon. There were numerous small serosal hemorrhages. A few fibrous adhesions were located in the right upper abdomen around the liver and in the lower portion of

the right pleural cavity. Liver and spleen were slightly enlarged, the former weighing 1,850 grams and the latter 350 grams. The lungs were moderately congested.

Except for the right fallopian tube, the gross appearance of the viscera and body cavities was otherwise normal. In the right fallopian tube at the junction of its proximal and middle thirds, was a solid ovoid mass, 2 cm in length and covered by intact serosa and attenuated muscularis (fig. 1A). Its cut surface was firm and gray, and it lay within the lumen of the tube, being attached to the mucosa by a broad base. The red hematopoietic marrow of the lumbar vertebral bodies was largely replaced by nodular gray tissue (fig. 1B).

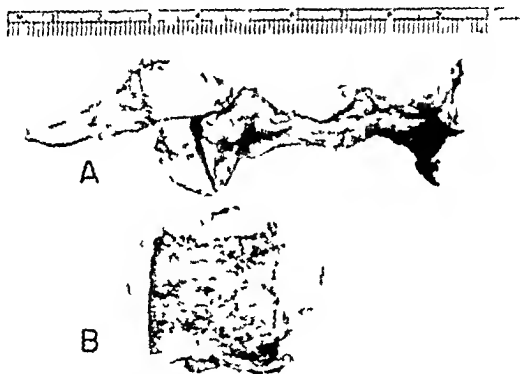


Figure 1 (A) Right fallopian tube containing carcinoma at junction of proximal and middle thirds. (B) Lumbar vertebral body containing nodular metastatic tumor. (Photograph by Jim England)

Microscopic examination revealed papillary adenocarcinoma of the right fallopian tube (fig. 2) with widespread hematogenic dissemination. Plugging of pulmonary arteries and alveolar capillaries by embolic tumor cells was particularly widespread (figs. 3 and 4). Intravascular tumor emboli were noted in most of the parenchymatous organs. There was massive replacement of hematopoietic tissue by tumor in sections of lumbar vertebral marrow (fig. 5). Extramedullary hematopoiesis was noted in the spleen. The uterine cavity was lined by menstrual endometrium, as would be expected with the usual cycle of 28 to 30 days.





Figure 2 Photomicrograph of right fallopian tube showing papillary adenocarcinoma and tubal mucosa. ( $\times 50$ ) (Courtesy of the Armed Forces Institute of Pathology)



Figure 3 Photomicrograph of lung showing tumor emboli in pulmonary arteries. ( $\times 165$ ) (Courtesy of the Armed Forces Institute of Pathology)



Figure 4. Photomicrograph of lung showing tumor emboli in alveolar capillaries. (X 165) (Courtesy of the Armed Forces Institute of Pathology)



Figure 5. Photomicrograph of lumbar vertebral body of hematopoietic marrow by metastatic tumor (X 165) (Courtesy of the Armed Forces Institute of Pathology)

## Pathologic diagnoses

- 1 Adenocarcinoma, right fallopian tube, with metastases to bone marrow, liver, lungs, spleen, hypophysis, adrenals, and ovaries
- 2 Myelophthisis and hemolytic anemia

## COMMENT

Doctor Kuehn \* Anemia is one of the common manifestations of cancer and other neoplastic diseases. The incidence of anemia in patients with cancer obviously depends in large part on the type and stage of progression of the neoplastic process. In general, anemia is usually associated with the more advanced stages of the disease, and even then is most frequently mild or moderate in degree. Symptoms due to anemia, however, may be the presenting complaints of the patient with cancer, and the anemia may be severe.

We may classify anemias occurring in cancer patients as follows: (1) iron deficiency anemia, (2) megaloblastic anemia, (3) myelophthisic anemia, (4) hemolytic anemia, and (5) myelopathic anemia.

1 *Iron deficiency anemia* Iron deficiency anemia caused by chronic blood loss from ulcerative neoplastic lesions, particularly of the gastrointestinal tract, is commonplace among patients with cancer. The usual findings are characteristic hypochromia, microcytosis, variation in size and shape of the mature erythrocytes, normoblastic hyperplasia of the bone marrow, and a low serum iron.

2 *Megaloblastic anemia* While macrocytosis may be a feature of the hemolytic or myelophthisic anemias associated with neoplastic disease, the association of a truly megaloblastic anemia with cancer is unusual. It is virtually limited to gastric carcinoma. The high incidence of gastric carcinoma in patients who have had pernicious anemia is well known.

3 *Myelophthisic anemia* While the anemia associated with disseminated cancer cannot usually be ascribed to replacement of the bone marrow by the neoplastic process and its accompanying fibrosis, such replacement does occasionally occur and gives rise to a distinctive hematologic picture which is indistinguishable from that observed with bone marrow replacement due to other causes. The distinctive characteristic of this type of anemia is the presence of immature granulocytes and of nucleated erythrocytes in the peripheral circulation. These are claimed to arise from the foci of extramedullary hematopoiesis. The extent of bony involvement varies from minimal

to extensive, without apparent relation to the hematologic manifestations of myelophthisis. The hematologic abnormality appears unrelated to the type of osseous metastasis, that is, either osteoblastic or osteolytic, or both, or to the duration of the lesions. The nonnucleated erythrocytes in the peripheral blood are normocytic or slightly macrocytic. They show polychromasia, basophilic stippling, and variation in size. A moderate reticulocytosis is common. Because of the reticulocytosis, the frequent splenomegaly, and the occasional presence of jaundice, the possibility has been suggested that the anemia may be hemolytic in nature. The usual tests for red cell and serologic autoantibodies are almost invariably negative. Erythrocyte survival studies, however, do show a decreased survival of autogenous and homologous red cells, but it is not of such a degree as to account entirely for the anemia. Consequently the deficit in erythropoiesis appears to be of primary importance. This deficit seems reasonably ascribable to marrow failure since bone marrow aspirations usually yield very scanty, hypocellular material.

4 *Hemolytic anemia*. Classical, acquired hemolytic anemia, with acholuric jaundice, marked reticulocytosis, spherocytosis, and auto-sensitization of the red cells is relatively common in chronic lymphatic leukemia and the malignant lymphomas. It has also been described in ovarian teratomas, but such an anemia is rare in the carcinomatous diseases. Only a dozen or so cases are reported in the literature. Almost all have been observed in association with widespread bone marrow metastases. The primary site of cancer has usually been the stomach, but it has also been reported for the bronchus, pancreas and large intestine. In several of the cases the manifestations of hemolytic anemia were so prominent that the patients were considered to have idiopathic acquired hemolytic anemia before a diagnosis of cancer was established. The relationship of this syndrome to the more usual myelophthisic anemias is not clear. Both have in common the finding of cancer cells invading the bone marrow, and in both there is an increase in the rate of red blood cell destruction. In hemolytic anemia, however, the evidences of increased destruction are much more obvious, and there are clear evidences of considerably increased erythrocyte production, as manifested by reticulocytosis, which is usually well above 10 per cent and may be as high as 80 per cent, and by the normoblastic hypercellularity of the bone marrow.

The pathogenesis of this hemolytic anemia remains speculative. In only one recorded case was there evidence of auto-sensitization or serologic agglutination, and even this cannot be well established, since the apparent auto-sensitization may have been the consequence of transfusion. It has been suggested by Naugle<sup>2</sup> that the stagnation of blood in marrow sinusoids be

hind tumor emboli might lead to "hemorrhagic extravasations" within the marrow and thus contribute to an apparent hemolytic anemia. It has been reported by Gross<sup>7</sup> that extracts of carcinomatous tissue may lyse homologous erythrocytes. It is conceivable, then, that stagnation of blood in the sinusoids might expose the red cells for more or less prolonged periods to the lysins associated with the cancer cells, and thus lead to intense hemolysis.

**5 Myelopathic anemia** When the preceding types of anemia associated with cancer are eliminated, there are still large numbers of patients with cancer who have an otherwise unexplained anemia. The majority of these patients do not have bone marrow metastases. It is characteristic of this type of anemia that it is mild or moderate in degree. The erythrocytes are normochromic, or occasionally slightly microcytic and hypochromic. Reticulocytosis is within normal range or slightly elevated. The bone marrow appears normally cellular, or it may show a mild normoblastic hyperplasia.

As in the anemia of infection, with which the myelopathic anemia or cancer is apparently identical, there appears to be an abnormal metabolism of iron. Serum iron levels tend to be low, as do the concentrations of iron binding globulin, yet the iron stores of the body are higher than normal. The mechanism of the diversion of iron from the plasma to the reticulocadothermal system is not understood. Recent studies in the last few years

have shown a decreased survival of normal erythrocytes transfused into patients with this anemia. Other studies indicate that the increased rate of erythrocyte destruction is due to premature aging of the normal erythrocytes in the patient's circulation rather than to some serologic or tissue factor destroying red cells at random. Regardless of the mechanism of red cell destruction, there are apparently other factors occurring in this anemia. Studies indicate that in patients with this type of anemia, the bone marrow does not compensate to the extent that the normal bone marrow can.

**Doctor Lucas \*** In less than 5 per cent of reported cases of carcinoma of the fallopian tube has a correct preoperative diagnosis been made.<sup>4</sup> Pain, often colicky in nature, and localized to one lower abdominal quadrant, is usually present. Rapid distention of the tubal wall by tumor has been postulated as the cause of the early occurrence of pain. Reported survival rates have in general been poor, varying between 0 and 40 per cent.

---

Lt. Willi m E Lucas MC, USN Ob stetrics and Gynec logy Service.

## REFERENCES

1. Ley A. D. Mechanisms of death in cancer. *N. Engl. J. Med.* 4: 8-9, 870 May 1956.
2. Waugh T. R. Hemolytic anemia: case, course, and treatment. *Am. J. Med. Sci.* 191: 160-169 Feb. 1956.
3. Gross L. Destructive action of human cancer extracts on red blood cells in vitro. *Proc. Soc. Exper. Biol. Med.* 92: 1-2, 1956.
4. Israel S. L. Cris W. E. and Linas D. C. Experimental induction of primary carcinoma of fallopian tube. *Am. J. Obst. Gynec.* 64: 1-2, 1 Dec. 1956.

## SIMPLE IDEAS PRODUCE GREAT DISCOVERIES

The clinician, as he looks with some envy at the beautiful, peaceful laboratories of his colleagues in the basic sciences should recall the lowly origin of many of the most important medical discoveries. Although Jenner was the first to demonstrate the potentialities of vaccination of smallpox, the procedure originated in some prehistoric and devoid of gleaming laboratories and scientific patterns. Withering listened to the tales of an old woman's secret remedy for dropsy, identified foxglove, and thus discovered digitalis. Many years later, Vogel noted that guinea pigs less readily churning the urinary output of patients, regularly recorded an increase after the administration of an organic mercurial to syphilitic patients; thus was the clue in effect of the mercurial drugs discovered. Sir James Mackenzie studied the patients who came to him and wrote his classic treatise on heart disease. Lord Liston paid no attention to the importance of the discoveries of Pasteur, instituted a laboratory in the operating room and founded modern aseptic surgery. George Minor and William Mayo fed liver to guinea pigs with pernicious anemia, made a completely new discovery, recorded in case reports, won the Nobel Prize, and added many years to the lives of world cancer victims. The methods used by these men were all commonplace ideas were present, ideas arising in groups and individuals, with persistence and perseverance, the clinical day-by-day can help to extend our knowledge and push back the borders of the unknown.

—THE LATE DR. J. J. M. J. J. J.  
 1000 North 10th St., Madison  
 W. 376, Oct. 1957

## SERVICE ARTICLES

# ARE WE OVERLOOKING THE EFFECTS OF COMBAT EXPERIENCE IN SOME OF OUR PSYCHIATRIC CASES?

CHARLES S. MULLIN *Captain MC USN*

**I**N A RECENT article by McMullin there is the following intriguing statement

"A rather striking phenomenon observed in our [naval psychiatric] hospitals during these past several years (1951 through 1954) has been the rarity of combat neuroses and the infrequency of any type of psychiatric disorder that could be correlated with combat situations. Those of us who saw hundreds of such cases in World War II now are hard pressed to find even one or two cases for teaching purposes."

Can it be that we are overlooking the importance of combat experiences in the initiation and perpetuation of psychiatric disability as seen in our military practice? There does appear to be a curious diagnostic blind spot, particularly among the more "analytically oriented" of our fraternity, in considering the possible influence of combat experiences in determining the development of a psychiatric disorder where the combat experience may have occurred many years before.

I have tried to be disciplined in my evaluation of what constitutes evidence of the psychotraumatic effects of combat. If a man has been exposed to intimate combat experience and thereafter intermittently or continuously has suffered a definite personality change characterized by such manifestations as depressive ruminations about these experiences, acoustic hypersensitivity, more or less severe startle reaction to sudden noises—particularly those noises resembling the sound of gunfire, explosions, or cetera—a phobic avoidance of stimuli suggestive of the combat situation, nightmares of combat scenes, marked irritability often associated with explosive rages and a general reduction of executive effectiveness, then some respect should be shown to the possibility that the traumatic effects of the experiences themselves are still operating. The fact that

---

From U S Naval Hospital Camp Pendler in Calif

over the years a complicated role in the development of the secondary dependent conflict has been revealed, and the obscure the traumatic "core" symptoms.

The cases of three patients who happened to be in my own small service at the same time illustrate the problem. They were three young men, officers unknown to one another, who had been admitted with varying presenting complaints and whose cases had been worked up in great detail, each by a different psychiatrist. In each instance the psychiatrist was competent in one or more of the had 8 years of experience in creating serious alienation and importance of combat experiences in the past, but the importance of adjustment was totally missed in each of the cases. In fact in hospitalization. In two instances, the psychiatrists, by their combat experiences were important in the past, but the importance by our psychiatric social service workers who happened to take an additional history. In the other instance, while the psychiatrist to assist the psychiatrist in charge of the case to understand the origins of the patient's illness. I concluded that the psychiatric that combat experiences were important.

Understanding the role of traumatic factors in the development only to diagnosis, but also, very empirically, to a logical treatment.

Case 1 A sergeant was admitted because of "nervousness" as well as with alcoholism and unauthorized absences, flu periods, depression with suicidal rumination, over the consequences of unauthorized absences. The present illness, as recorded by the psychiatrist contained no reference to combat and neither did the past history which happened to be singularly free of evidence of psychiatric abnormality. In fact, this particular patient on the service psychiatric abnormality. In fact, this particular patient on the surface at least seemed to have been exceptionally well adjusted to combat. However, the diagnostic impression was "A mild adjustment disorder with strong homoerotic and latent passive dependent factors." A routine history was obtained by our social worker from his family who volunteered the information that the patient had shown a rather personality change on his return from Korea in 1951. In addition to other manifestations he showed a marked attitude reaction, phobic responses to reminders of combat and in the past at least had shown the typical dream life.

The medical officer in charge of the case, with his attention thus transiently directed to the combat experience, asked the patient about these experiences and was rewarded by a spontaneously cathartic outpouring which resulted in some apparent symptomatic improvement. (It is interesting that none of the three patients volunteered any information about their combat experience or its apparent psychological effects on them.) Thereafter, for two months of hospitalization there was no reference to combat or its effects. No further abreactive at



tempts were made Shortly before his discharge the patient went AWOL and claimed amnesia for his absence The doctor's progress note almost, but not quite hits the mark "The patient's last recollection was of being bumped from behind by another car while driving his own The loud bang (of the collision) took me by surprise I felt very shaky and tense and I could not understand why such a little bump should excite me so much The patient feels that something in the accident was reminiscent of his past but cannot pinpoint his feelings in this regard Anyone who has seen a violent dissociative response of a combat neurotic under Amytal (brand of amobarbital) when a loud noise is deliberately made by the therapist in the hope of precipitating abreaction, may have some idea of what happened in this case

Case 2. The second patient also a sergeant was admitted to the hospital with diagnosis undetermined, hypertensive vascular disease A history taken by the Medical Department contained no reference to his 11 months in combat which included some particularly harrowing experiences Likewise an extensive neuropsychiatric consultation made no reference to these overseas experiences He was transferred to the Psychiatric Department because of suicidal feelings and "tension" A psychiatric history of the present illness and an extensive past history which incidentally also indicated a good enough pre-service adjustment contained no references to the effect of combat except that it was mentioned that he was the recipient of a Bronze Star An alleged suicidal attempt while in Korea was described this being attributed largely to family difficulties at home Furthermore a work up at a naval hospital at the time of this suicidal attempt failed to mention anything about combat The diagnostic impression was schizoid personality Nowhere in the progress notes that succeeded was there any reference to combat or its effects Psychologic tests were reported as evidencing depressive components in a passive dependent personality with little likelihood of genuine suicidal attempts A three page social service history taken by our worker some time after the patient's admission to the service revealed that "when he returned to the States in July 1951 he seemed to have many symptoms suggesting an acute anxiety state had frequent combat nightmares and would awaken sweating and anxious" This type of dream plus morbid daydreaming about his experiences with particular reference to the fact that he was one of 16 survivors of an outfit that had originally had several hundred personnel had continued with various remissions and exacerbations until the present time

Case 3 The case of a third sergeant happened to be worked up by two different medical officers because of reassignment of one of them Each doctor took a complete history In the first anamnesis there was no reference to combat The second and very extensive history described the man's combat experience but made no mention of his reaction to these experiences In one case the chief complaint

was recorded as follows "History of gradually deepening depressiveness and unworthiness in recent months in apparent relationship to an affair with a married former sweetheart, now in the process of divorce." In the other write up, the principal complaint was indicated as nervousness and "trouble in public speaking." Finally, our capable social worker this time missed the import of combat entirely and focused exclusively on current problems. This is not to suggest that the solution of current problems may not be of great importance, the fact remains that these problems had developed and been augmented because of the existence of a "traumatic" neurosis. The patient manifested a great deal of anxiety and hostility, and strenuous attempts were made by his medical officer to relieve him of these symptoms by discussion of current life difficulties, without much effect.

Finally, 6 weeks after admission, his medical officer asked me to interview the patient with a view to offering therapeutic suggestions. Basically the sergeant appeared to be suffering from the effects of a combat induced "traumatic" neurosis, characterized by marked anxiety associated with extreme autonomic overaction, extreme irritability, outbursts of rage, acoustic hypersensitivity, marked startle reaction, inability to tolerate discussion of painful experiences in Korea, and continued dreams of combat experiences.

At this point the question might be asked, "Once the conclusion has been reached that combat experiences have made a contribution to the development of a man's psychiatric illness, does this make any difference in the therapeutic management of the case?" In this case, over a period of about 6 weeks a total of 6 abreactive sessions were carried out, using Pentothal Sodium (brand of thiopental sodium). In each instance there was violent abreaction of specific combat experiences, associated with extreme terror and guilt. The patient relived these experiences in the present tense and in minute detail and with electrifying intensity. After each session, there appeared to be some improvement in symptoms. Headaches that he had complained of disappeared, anxiety became markedly reduced, outbursts of irritability entirely disappeared, dreams of combat cleared up, appetite was restored, and the patient stated, "I haven't felt as good as this for years." This man was ultimately discharged from the service and a chance follow up 6 months later revealed that he had held his improvement.

Although not germane to the purposes of this presentation, it is interesting to speculate why these abreactive sessions seem to be associated with marked improvement. Is it some form of nonspecific "shock" treatment, the simple effects of repeated violent expression of repressed emotion, the significance of the tender and solicitous laying on of hands involved in these 6 sessions, or is it the opportunity vigorously to ventilate the incubus of a long festering guilt and terror experience in the presence of a reassuring and guilt relieving authority?

dren, over aggressive children, children who swear profusely, children who set fire children who steal children who fabricate, children who are involved in disturbing sexual activity, children who persist in thumb-sucking, and children who are frankly schizophrenic. In attempting to analyze the general situation in the Far East, many factors appeared to be important in the pathogenesis of these problems.

### FAMILY RELATIONSHIP IN NEW ENVIRONMENT

We are concerned with families who have been transplanted from their home environment to one that is unfamiliar to most of them. Some of the families come to this new environment willingly, and others come reluctantly. Parents and children leave friends and relatives behind and find themselves one morning in a strange land where customs are different, where they know no one and where the process of establishing new friendships has to begin all over again.

Often children leave school in the middle of the year. After being out of school for several weeks they start in a different and unknown setting and some of them find the transition extremely difficult.

In most instances families begin their lives in this environment in private rental houses where communication with natives is difficult because of language barrier and where communication with fellow countrymen is hampered because of lack of telephones and transportation.

The father frequently precedes the rest of the family by several months and may during that time establish some kind of extramarital relationship with local women. On arrival the wife often suspects or fantasizes such relationships, in either case her security is threatened in varying degrees. Divorce may be talked about openly and sometimes it appears that the children are the only forces keeping the family intact. At times the family is able to have a full time maid and the parents take advantage of this seemingly fine state of affairs to leave most of the direction of the children to the maid. Concomitantly with this the base activities for children sometimes are utilized to excess, the children being pushed into the activities without needed parental guidance.

The nature of the father's work occasionally keeps him away from home for unnatural lengths of time and this is cause for concern in the family.

Thousands of miles separate the families from their relatives. The distance accentuates normal worry and anxiety about the health and welfare of those who mean much to them.

These factors are but a few of the multidimensional influences affecting service families in the Far East. Some of them arrive in the theater with already disturbed family relationships, and one additional factor or a combination of factors may be instrumental in precipitating still worse relationships that are reflected in the disturbed behavior of a child.

The disturbance in the family becomes cyclic—the father is unhappy, the mother is unhappy, and the child is unhappy. This turbulence often is reflected in reduced effectiveness of the father as a member of the Air Force. With the current and rightful emphasis on total family care in the Air Force, it was considered important that an attempt be made to work with these problems in such a manner as to maintain and facilitate the integrity of the family unit. Consequently, a plan was developed to establish a child guidance program by which both the child and his parents could be assisted.

### STANDARD CHILD GUIDANCE CLINIC

The usual child guidance clinic of the general type described by Scheibel, Zehrer, and Chambers<sup>1</sup> and by Montague and Thompson<sup>2</sup> is operated in a fairly definite and well established pattern. The procedures are time consuming, automatically limiting the number of children who can be seen. Professional personnel represented are clinical psychologist, psychiatric social worker, and psychiatrist. When a child is referred to such a clinic, a certain routine is followed. Initially the social worker will conduct an intake interview with the parent or parents, then the child may be seen several times by the psychologist for a battery of testing, and the physician may observe the child in the play therapy setting before all of the data collected are discussed and analyzed at an intake conference. At that time a decision is made as to who will be the child's therapist and who will work with the parents. Then a series of appointments are made, the frequency varying from once to several times a week. Following each therapy session with the child and his parents, brief discussions are held between all the professional personnel concerned with the sessions just concluded. Periodically, staff conferences are held for review of the case in its entirety.

### THE SIMPLIFIED PROGRAM

Such an approach to the treatment of emotional problems in children is ideal, but it was obvious from the first that we could not follow an ambitious program because of many limitations, chiefly in available time and personnel. It was impossible to predict very far in advance how many of the three disciplines (those of the clinical psychologist, psychiatric social worker, and psychiatrist) would be represented on the staff, and whether, when all three are represented, all would be interested in working with the problems

of children. Only a fraction of our time could be devoted to such a program because of a large outpatient service for military personnel and dependents, in addition to a 30 bed ward for the military—all of which are time and energy consuming. What could be done under the circumstances? We declared our interest in working with such problems insofar as time and personnel permitted, a play therapy room was equipped, and we were in business.

The process had to be streamlined, and this is essentially our operation at present. The social worker or social work technician interviews the parents as soon as possible after the initial referral, obtaining as much background data as possible and recording his observations of the parents and their interaction during the interview. A subsequent appointment is made for the parents and child to see the physician. At this time the child is observed in the playroom for about 30 minutes, and then the parents are interviewed briefly. On the basis of the data available the physician conducts a kind of "summing up" with the parents.

At this point one of several things may happen:

1 It may develop that the problem is not a real one and that what is needed is for someone to explain to the parents that the behavior of the child is normal for his age.

2 It may be that the problem is not severe enough to require frequent visits to the clinic. In this case, the physician points out to the parents during the "summing up" what factors are important in the particular situation and makes suggestions. The parents are sent home to carry out these suggestions for four to six weeks, after which they are to call us. Many times the problem is resolved in this length of time. If not, parents and child are brought back for another appointment, more data is gathered and again certain suggestions are made in view of whatever has transpired in the interval. They are asked to report again in four to six weeks, and if at the end of that time appreciable progress has not been made, we take them on more frequently. In this case the parents are usually seen by the social worker while the physician works with the child. Informal discussions are held among the professional personnel from time to time so that data can be exchanged and evaluated.

3 In some instances it is obvious from the initial visit of the child and his parents that the matter is serious and will require a more intensive approach. Appointments are made at weekly or more frequent intervals for the child to be seen in the playroom while the parents are being seen by the social worker.

4 In the rare situation that is considered inoperable under the circumstances, it is recommended that the family be returned to the United States where the needed assistance can be obtained.

If appropriate, we make contact with some civilian agency in the United States where the parents can seek help

### DISCUSSION

The types of problem situations referred to the clinic may be (1) behavior problems such as excess timidity, fearfulness, and seclusiveness—problems manifested generally in the personality, (2) problems manifested in socially unacceptable behavior such as fighting, bullying, temper tantrums, disobedience, exhibitionism, stealing, cruelty, and sexual difficulties, (3) problems of habit formation such as enuresis and speech defects, (4) problems of development such as mental retardation, mental acceleration, and difficulty in reading and spelling, and (5) psychosomatic problems such as urticaria and asthma

Our preliminary observations regarding the need for a child guidance program have been substantiated. There is no well defined yardstick by which to measure the success of such a program, but no one can overlook the disappearance of disturbing symptoms in a child and better integration of the family as a unit. There is considerable evidence to suggest that such a program has contributed appreciably to the morale and efficiency of the families who have used the facilities of the clinic. The program has been received enthusiastically by teachers and school nurses. Further evidence of the acceptance of such a program in the ever widening geographic area from which patients are referred.

The modified approach that we have described has worked effectively in civilian practice and is considered adaptable to the needs of the Air Force setting at this overseas hospital. Here the work must be accomplished by limited personnel operating under the handicap of a heavy patient load, which precludes, particularly in an overseas area, the operation of a child guidance clinic along classical lines.

### REFERENCES

1. Scheibel, H. B., Zetser, F. A., and Cloutier, P. J. Establishment of child guidance clinic in Army general hospital. *Brill U. S. Army M. Dept. 5* 44347, Jan. 1949.
2. Montague, E. K., and Thomas, F. F. Child guidance clinic in general hospital. *U. S. Armed Forces M. J.* 7:173-175, Dec. 1953.

"The use of salicylate appears to increase the frequency of bleeding in patients with severe gastric ulcers."

—J. J. KISS, Jr., M.D.,  
U. S. Armed Forces Medical  
Institute, Fort Belvoir, Ill.

# OBSERVATIONS ON THE DYNAMICS OF LEADERSHIP

## A Methodologic Approach

DENNIE L. BRIGGS *Lieutenant MSC, USN*  
IRVING D. BERG *Lieutenant MC USNR*

WHILE STATIONED in a large naval general hospital for the past two years we were impressed by the interaction among various staff members, between medical, surgical, and psychiatric patients, and between staff and patients. In addition to the medical staff, consisting of career and reserve medical officers, there were medical administrators, officers of the allied medical sciences nurses, and hospital corpsmen all with distinct symbols as to their rank either in military or civil service. The patients were officers and enlisted personnel, both men and women, of various ranks and rates, in addition to dependents.

We often were struck by the interaction that took place in so many different ways and on so many different levels, particularly the formation of groups within the military structure. Often, the hospital, extraordinary situations occurred that involved personnel with higher or lower professional status and that called for personal and social adjustments not encountered elsewhere in the military. Even within groups formed spontaneously, there was the factor of intertask relationships where social status was not recognized as easily, but where prescribed behavior was rigidly observed.

In the course of observations made while teaching, conducting group therapy, and holding ward staff meetings and discussion groups, we were impressed by the development within the groups of a certain hierarchy that seemed to establish itself automatically. We also were aware of what seemed to be the assumption of positions of leadership, "followership" and "going along ship" by members of the groups. We became interested in how the language, perspective, and viewpoints varied among the dif-

---

Presented at the annual meeting of the American Sociological Society, Washington D. C., 1955.

From U. S. Naval Hospital, Oakland, Calif. Lt. Briggs is now assigned to U. S. Naval Hospital, Navy No. 3923, FPO San Francisco, Calif.

ferent groups. We thus became curious as to what went on in those "natural groups" and what factors took place in the establishment of the hierarchical arrangements within the groups, in addition to finding out more of the purposes served by these relationships.

Noting the observations made by Parsons,<sup>1</sup> Caudill and associates,<sup>2</sup> Stinton and Schwartz,<sup>3</sup> Fox,<sup>4</sup> and others concerning the participation of the hospital as a social system in the treatment and course of illness, we were interested in developing more systematic methods of observation, particularly of the groups that formed and of the dynamic interaction that occurred within those groups.

Any particular group that was not formed artificially by calling together various individuals as subjects into a nonmeaningful group became a subject for investigation. We observed the patients getting together themselves, hospital corpsmen working together, the staff of a particular ward, or coterie, thus our studies represent particles of the vastly complex interaction going on in a military hospital.

### METHODOLOGY

In this article our main interest is to present a methodologic approach that was designed to integrate sociologic, psychologic, and psychiatric theory and technique. We wished to recapture the social setting of the particular group under study with a minimum of disruption by research procedures. Each technique was chosen as one with which the members were familiar, or one that contributed to the atmosphere being investigated. The groups selected were "natural groups" in the sense that the members themselves had gotten together as friends or associates, or were working together in a staff-patient relationship. Those groups studied had close contact with the investigators in a teaching or therapeutic relationship. It was our belief that the spirit of cooperation exhibited contained little or no acquiescence. The techniques themselves were chosen and adapted to keep the setting as natural as possible within the framework of the hospital.

In considering the feasibility of adapting acceptable research procedures from the various disciplines to contribute to a holistic approach, we chose those methods that we believed were sound experimentally and acceptable to our participants. Before using any procedure with which the group was not familiar, its use was discussed and worked through in the group. For example, when tape recordings were used—a procedure familiar to most of the participants—group members operated the recording apparatus themselves and were allowed to listen to the playback at any time.



We selected the Rorschach test because it is an accepted technique in clinical psychology, was a familiar procedure at the hospital, yet presented a relatively unstructured stimulus that most of the group members had not actually seen previously, although all knew it was a device to reveal material unknown to the testee. Thus some "test anxiety" was mobilized as part of the experimental procedure. This was utilized and accounted for, as we shall discuss presently.

The Rorschach test was individually administered and was interpreted in the traditional manner as presented by Beck.<sup>4</sup> Later, a modification was introduced that had not to our knowledge been used previously. In one of the group sessions, it was announced that the next session would be devoted to an experiment. In the following session, the Rorschach cards were shown to the group as a stimulus for discussion. The members were asked what they saw as a group in each card in an allotted time, and their impressions were recorded. Immediately following this session, their individual impressions were taken again to measure any possible aftereffects of the interaction that had occurred.

The Rorschach test thus was used clinically to obtain a personality description of each member and of the group as a whole, in addition to being used thereafter as a somewhat familiar stimulus for discussion. Its unique feature in this experiment, however, was that in a sense we also obtained a measure of the "group personality" together with an estimate of both individual group dynamics in operation. We saw an individual's private self as well as those he voiced publicly and the manner in which he operated in a group. In addition, we watched similar interaction for the group as a whole. An individual might see a percept that through previous research has been established as one indicating a particular disturbance in psychic functioning, and introduce this percept into the group discussion. If the percept was ego-alien or not acceptable to the group, disagreement might ensue and the individual would be forced to make a stand or withdraw. Through later content analysis of the percepts, we were thus able to gain insight into the particular meaning of the individual's thinking both privately and in the group setting.

Group sessions were tape recorded and transcribed. The interaction was charted according to a modification of Baltes' "Interaction Process Analysis,"<sup>5</sup> momentarily disregarding interpretation of the psychological meaning of the test responses.

At another session, the groups were asked to make various choices of the members' behavior, utilizing Taguri's "Relational Analysis" technique.<sup>6</sup> Each member was seen individually for psychiatric interviews and an associative anamnesis was taken. Impressions also were noted from the content of the group meetings (i.e., reactions to lectures, feelings expressed in therapy

sessions, et cetera) by the investigators who were meeting with the groups.

### OBSERVATIONS

The observations presented here are tentative and warrant a very extremely cautious interpretation and generalization. We have not subjected them to statistical verification and have not used them outside the clinical setting of the hospital. They are based on the basis of a number of hypotheses that we are investigating.

We observed through the interaction and the Rorschach responses that there were many personal feelings and ideas present which a person would not voice publicly (i.e., his private ideas), and others that a person could not reveal even to himself, as he was not conscious of their existence. Our research thus far brings out the following points regarding the interaction of the group and the dynamics of the leader in a spontaneous social setting.

(1) In group discussions, the members were selective in the material they brought forth, and tended to reveal those private ideas and feelings least disturbing or alien to the group (i.e., they revealed most often those ideas that were more acceptable to the group or "group syntonic").

(2) Where some of the group-apparent material coincided with ego-alien material (i.e., material which was unacceptable to the ego and therefore not previously capable of being integrated by the ego) the ego-alien material became integrated into the individuals' experience and following the group experience, they could safely add these ideas to their conscious repertory.

(3) The leader, as obtained by sociometric choice, was the one who was more capable of incorporating by his ego-integrative capacity ideas that came from the group, and possibly ideas that he could not previously have brought to acceptance, i.e., those that might have been unacceptable to him before. Interestingly enough, this factor appeared to operate in groups of psychiatric patients as well as in nonpatient groups.

(4) The degree of freedom (via the group conscience) seemed to be more limited than that of the individuals composing the group. Socially unacceptable ideas that were not privately ego-alien still tended to be treated as unacceptable in the group. The group served to censor ideas and admitted those considered socially mature and thus more socially acceptable. The individual privately entertained as acceptable ideas that in a social setting were voiced as unacceptable, thus establishing and reinforcing mores and social controls.

(5) The leader subtly introduced his private ideas to the group. If they were rejected, he did not enforce them (He did not want to press the point when he noticed the tenuous status of his ideas with regard to acceptance by the group). Did the other members take on his ideas privately, while not publicly?

We selected the Rorschach test because it is an accepted technique in clinical psychology, was a familiar procedure at the hospital, yet presented a relatively unstructured stimulus that most of the group members had not actually seen previously, although all knew it was a device to reveal material unknown to the testee. Thus some "test anxiety" was mobilized as part of the experimental procedure. This was utilized and accounted for, as we shall discuss presently.

The Rorschach test was individually administered and was interpreted in the traditional manner as presented by Beck.<sup>4</sup> Later a modification was introduced that had not to our knowledge been used previously. In one of the group sessions, it was announced that the next session would be devoted to an experiment. In the following session, the Rorschach cards were shown to the group as a stimulus for discussion. The members were asked what they saw as a group in each card in an allotted time, and their impressions were recorded. Immediately following this session, their individual impressions were taken again to measure any possible aftereffects of the interaction that had occurred.

The Rorschach test thus was used clinically to obtain a personality description of each member and of the group as a whole, in addition to being used thereafter as a somewhat familiar stimulus for discussion. Its unique feature in this experiment however, was that in a sense we also obtained a measure of the "group personality" together with an estimate of both individual and group dynamics in operation. We saw an individual's private thoughts as well as those he voiced publicly and the manner in which he operated in a group. In addition, we watched similar interaction for the group as a whole. An individual might see a percept that through previous research has been established as one indicating a particular disturbance in psychic functioning, and introduce this percept into the group discussion. If the percept was ego alien or not acceptable to the group, disagreement might ensue and the individual would be forced to make a stand or withdraw. Through later content analysis of the percepts we were thus able to gain insight into the particular meaning of the individual's thinking, both privately and in the group setting.

Group sessions were tape-recorded and transcribed. The interaction was charted according to a modification of Balas' "Interaction Process Analysis,"<sup>5</sup> momentarily disregarding interpretation of the psychological meaning of the test responses.

At another session, the groups were asked to make various choices of the members' behavior utilizing Taggart's "Relational Analysis" technique.<sup>6</sup> Each member was seen individually for psychiatric interviews and an associative anamnesis was taken.<sup>7</sup> Impressions also were noted from the content of the group meetings (i.e. reactions to lectures, feelings expressed in therapy

and to their countrymen, in the case of those to whom the has entrusted its security, is far reaching.

We entered into this research with no preconceived ideas. We have made no attempt to test hypotheses. The research is in progress and specific findings must await stimulation. The next phase of our research emphasizes the invariants of ideas that are made public in a spontaneous social group, making use of sound motion pictures of social setting as much as possible.

Our intention in this article has been to present a new idea and an approach to observation on leadership. We have usually to arrive at a well-justified appraisal, involving the use of acceptable methods from sociology, dynamic psychiatry, psychology, and other behavioral sciences combined in a total approach, rather than from any specific discipline.

#### REFERENCES

1. Parsons T. Illness and role of physician: sociological perspective. *Am J Orthopsychiat* 21: 452-460 July 1951.
2. Candill W, Redlich F C, Gilmore H R and Brody F B. Social structure and interaction processes on psychiatric ward. *Am J Orthopsychiat* 22: 314-334 Apr 1952.
3. Stanton A H and Schwartz M S. *The Mental Hospital*. Basic Book Inc. New York N Y 1954.
4. Fox, R. *A Sociological Study of Stress: Physician and Patient on a Hospital Ward*. Unpublished Ph D thesis. Radcliffe College 1953.
5. Beck S J. *Rorschach's Test*. Volumes I, II and III. Grune & Stratton Inc. New York N Y 1944 1945 1952.
6. Bales R F. *Interaction Process Analysis: A Method for the Study of Groups*. Addison Wesley Press Inc, Cambridge Mass 1950.
7. Taylor J R. *Relational analysis: an extension of sociometry*. Emphasis upon social perception. *Sociometry* 15: 91-104 Feb-May 1952.
8. Deutsch F. Associative amnesia. *Psychosom. Quart* 8: 35-40.

#### INCREASE IN DEATHS FROM CORONARY DISEASE

"Much of the rise in the recorded death rate from coronary artery disease during the past 15 years reflects merely the increasing proportion of older people in the population and changing fashions in certifying heart disease as a cause of death. The real increase has been relatively small certainly not of the magnitude to justify the alarm expressed in the press and elsewhere."

—*Statistical Bulletin*  
Metropolitan Life  
p 1 Feb 1957

(6) Those persons whose egos were more capable of integration while not of leadership caliber, did this more often (i.e. they functioned more at a private level). Are these persons capable of becoming more of a leader in another group, after absorbing something of the leader that they did not have before? We believe they are, depending on the "social climate" of the new group and the new dynamics involved.

(7) The "going-alongers" were the least affected by the responses in any group. They also were the most disturbed clinically, both socially and psychologically (less participation in community affairs, et cetera). They manifested ambivalences of their roles and ideas as contrasted to the leaders and the followers who presented active expressions of their roles. The members who went along with others only hesitatingly raised points, mainly agreed, and went along with the others.

(8) In general, group experiences seemed to reduce potentials for expression (reduce the number of private ideas that were expressed publicly) but what was individually retained was more reality oriented and thus more socially acceptable. (After group experience, ideas were less frightening to the individual. This is perhaps one of the most important processes involved in group psychotherapy.) Original ideas were not lost but were condensed or diluted.

(9) The leader was one who was more able to accept his private ideas plus the ideas of the group and to integrate these into his own thinking.

(10) Leadership imparted to the follower and to other group members an crucial and important information for integrative functions.

#### DISCUSSION

It is recognized that mere participation in any sort of experiment engenders a certain amount of apprehensiveness, as does participation in most social situations. We have attempted to minimize "test anxiety" by familiarity with the investigators and by working through the feelings of the group members who are being studied prior to the procedure being introduced.

In the group setting, the leader has to make a choice as to whether he will run the risk of revealing some of his private thoughts and endure the stress involved in facing the possibility of losing his position. If he chooses to do so, this course of action is socially meaningful and presumably gives some measure of his stability where real or imagined stress is involved. Thus a man may be an acknowledged leader by military rank, social status, or as empirically defined by Bales' or Taguiri's procedure, but under the stress of revealing his inner thoughts he may break down. In a benign setting, decisions of this type are made under no great stress such as would be involved under threat of starvation, loss of one's life, or extreme pain, yet under these and other types of stress, leaders selected by the best available means do break down. The effect on morale to their associates

and to their countrymen, in the case of those to whom it has entrusted its security, is far reaching.

We entered into this research with no preconceived ideas. We have made no attempt to test hypotheses. The research is in progress and specific findings must await stimulation. The next phase of our research emphasizes the use of ideas that are made public in the social setting, social group, making use of sound motion pictures to simulate the social setting as much as possible.

Our intention in this article has been to present a methodology and an approach to observation on leadership. We hope eventually to arrive at a well-studied appraisal, involving the use of acceptable methods drawn from sociology, dynamic psychiatry, psychology, and other behavioral sciences combined in a total approach, rather than from any specific discipline.

#### REFERENCES

1. Parsons T. Illness and role of physician: sociological perspective. *Am. J. Orthopsychiat.* 21: 452-460. July 1951.
2. Caudill W., Redlich F. C., Gilmore H. R., and Brody E. B. Social structure and interaction processes on psychiatric ward. *Am. J. Orthopsychiat.* 22: 314-334. Apr. 1952.
3. Stanton A. H. and Schwartz, M. S. *The Mental Hospital*. Basic Books Inc. New York N. Y. 1954.
4. Fox, R. *A Sociological Study of Stress: Physician and Patient on a Research Ward*. Unpublished Ph. D. thesis. Radcliffe College. 1953.
5. Beck S. J. *Rorschach's Test*. Volumes I, II, and III. Grune & Stratton Inc. New York N. Y., 1944, 1945, 1952.
6. Bales R. F. *Interaction Process Analysis: A Method for the Study of Small Groups*. Addison-Wesley Press Inc. Cambridge Mass. 1950.
7. Tagiuri R. Relational analysis: an extension of sociometric method with emphasis upon social perception. *Sociometry* 15: 91-104. Feb.-May 1952.
8. Deutsch F. Associative anamnesis. *Psychoanal. Quart.* 8: 354-381. July 1939.

#### INCREASE IN DEATHS FROM CORONARY DISEASE

"Much of the rise in the recorded death rate from coronary artery disease during the past 15 years reflects merely the increasing proportion of older people in the population and changing fashions in certifying heart disease as a cause of death. The real increase has been relatively small, certainly not of the magnitude to justify the alarm expressed in the press and elsewhere."

—Statistical Bulletin  
Metropolitan Life Insurance Co.  
p. 1, Feb. 1957

## CASE REPORTS

### Ovarian Abscess Complicating Pregnancy

ROBERT C. LOEHN *Captain USAF (MC)*

**O**VARIAN ABSCESS complicating pregnancy is rare and few cases are reported in the literature. In the earliest case reported, by Aitken<sup>1</sup> in 1869, the patient developed a fatal peritonitis from rupture of an ovarian abscess during premature labor. In 1891 Coe<sup>2</sup> reported three cases of acute oophoritis complicating pregnancy. One patient improved under treatment, the second patient had an ovarian abscess rupture into the urinary bladder and later delivered a viable infant, the third patient had a septic episode in her seventh month of pregnancy, had an uneventful term delivery, and during her postpartum course had a surgical exploration because of an ovarian abscess. Brindeau<sup>3</sup> in 1917 reported a case of a fatal peritonitis that developed from rupture of an ovarian abscess immediately after a term delivery.

Pomini<sup>4</sup> described a case of a ruptured ovarian abscess which developed on the fifth day following a rapid, uneventful delivery, the outcome was fatal. An interesting and confusing case was reported by Dolan<sup>5</sup> of a left ovarian abscess associated with a right tubal pregnancy. Curmin<sup>6</sup> recorded a case of an ovarian abscess discovered in the fourth month of a patient's pregnancy. Exploratory laparotomy revealed free pus in the peritoneal cavity from a right ovarian abscess, and a right salpingo-oophorectomy was performed. The patient aborted a congenitally malformed infant twelve hours after surgery.

In a comprehensive discussion of ovarian abscess, Black<sup>7</sup> revealed that in 105 cases reviewed, the causative organism in 95 per cent of the cases was streptococcus. The other causative organisms were staphylococcus, colon bacillus, tuberculous, gonococcus, pneumococcus, et cetera. Ovarian infection occurred by the hematogenous route or by contiguity. It was Black's impression that primary involvement of the corpus luteum is not necessarily involved in all ovarian abscesses.

The following case is presented because of its rarity.

---

From Fitzsimons Army Hospital Denver, Colo. Dr. Kaehn is now assigned to 405th U. S. Air Force Hospital APO 237 New York, N. Y.

## CASE REPORT

**History** A 37 year old white female, para iii, gravida iv, was admitted to this hospital on 30 July 1956, with a history of having had mild lower abdominal cramping and pelvic pain for approximately 9½ hours Her last menstrual period was on 11 February 1956 The patient had been followed in the Prenatal Clinic at Fitzsimons Army Hospital since 14 May 1956 Examination at her initial prenatal visit revealed a uterus enlarged to the size of a 3 months pregnancy and a cyst, 2 cm by 2 cm in size, of a Skene's gland At that time the history obtained indicated she had had a pelvic inflammatory disease several years prior to her present pregnancy On admission to the hospital, there was no history of bleeding or rupture of the membranes, on closer questioning of the patient, it was found that she had had a similar episode of pain in the lower abdomen, especially in the right lower quadrant, in May 1956 and again in June 1956 At the June visit, a pelvic examination was not performed For 2 weeks prior to admission the patient had noted some irregularity of her heart, however, she had not experienced other cardiovascular symptoms

**Physical Examination.** Physical examination on admission revealed the following positive findings Blood pressure, 115/60 mm Hg pulse rate, irregular fine, moist rales heard posteriorly over both lower lung fields on auscultation of the chest, the fundus of the uterus was at the level of the umbilicus, there was marked tenderness in the right lower quadrant of the abdomen extending into the right flank area and mild generalized tenderness over the entire abdomen, marked right costovertebral angle tenderness Pelvic examination was deferred because the examiner thought that the patient might be in immature labor

**Laboratory Studies.** Hemoglobin was 12 grams per 100 ml, hematocrit, 36 ml per 100 ml, urinalysis, 6 to 8 white cells per high-powered field with multiple clumping of the cells in the urine Numerous bacteria were seen in the catheterized specimen of urine

**Course in Hospital** On 31 July 1956, the patient complained of anorexia and mild nausea and vomiting on several occasions Examination of the abdomen revealed mild distention and a decrease in the quality of bowel sounds It was considered that the patient had an acute pyelitis and a paralytic ileus On the same date a chest roentgenogram was obtained which was interpreted as within normal limits A cardiac consultation was obtained, and the cardiac service believed that no heart disease was present The electrocardiogram was interpreted as showing frequent premature ventricular contractions A flat plate of the abdomen obtained on the same day revealed a mild ileus, and a soft tissue shadow was observed in the lower abdomen displacing the uterus upward, probably representing an extrauterine mass in the pelvic region



The patient was treated conservatively for paralytic ileus and she responded very well. On 3 August 1956 a pelvic examination revealed a large mass posterior and inferior to the uterus the size was estimated to be approximately 12 cm in its greatest diameter. The mass was moderately tender. Up to this time the patient had been relatively afebrile. The patient had been on penicillin and streptomycin sulfate since 31 July, when the diagnosis of pyelitis had been made.

On 6 August 1956 the patient was taken to surgery where, under general anesthesia exploratory laparotomy was performed. At the time of exploration it was found that the large mass was on the right posterolateral surface of the uterus and was a large ovarian abscess. The fallopian tube on that side was moderately hyperemic however it was not adherent to the surface of the abscess. The ovarian abscess was adherent to the right posterolateral surface of the uterus, to the posterior wall of the right broad ligament and to the right lateral pelvic wall. Blunt dissection was employed in an attempt to remove the abscess and during this procedure the abscess was inadvertently ruptured. The entire right ovary with the abscess was removed. Culture of the contents of the abscess revealed alpha hemolytic streptococcus. The abdomen was closed in layers. The patient tolerated the procedure well with minimal blood loss.

Both preoperatively and postoperatively the patient was given procaine penicillin G (600 000 units) twice daily, and also 0.5 gram of streptomycin sulfate twice daily. Postoperatively the patient did very well and had a relatively afebrile course.

It might be noted here that the patient was placed on 50 mg of progesterone daily beginning the day before surgery and continued on it to 10 August 1956. On the 5th and 6th postoperative days the skin clips were removed. Pelvic examination prior to patient's discharge from the hospital on the 8th postoperative day revealed some thickening of the adnexal area more on the right side, but it was nontender.

**Postoperative.** The patient was placed in the obstetrics clinic and followed there for the remainder of her prenatal care.

The patient was admitted to the obstetrical labor room on 18 November 1956 in active labor. Labor progressed satisfactorily under analgesia induced by Demerol Hydrochloride (brand of meperidine hydrochloride), scopolamine and Thorazine Hydrochloride (brand of chlorpromazine hydrochloride). After five hours and five minutes the patient was delivered spontaneously under pudendal block anesthesia of a viable male infant. There were no complications in the third stage. The postpartum course in the hospital was uneventful.

**Pathologic Findings.** The ovarian abscess (fig. 1) was an irregular cystic mass weighing 150 grams. The external surface was smooth and glistening with marked congestion. The free surface was gray in color the attached surface was deep red. The contents consisted of a homogenous purulent material having a greenish cast with no

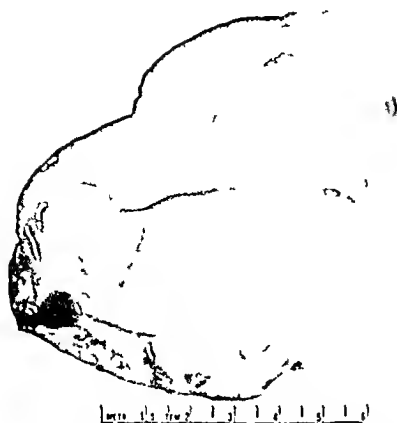


Figure 1 Gross specimen of ovarian abscess showing glistening congested surface. Darkened area represents area attached to the surrounding structures.

odor. The walls of the abscess averaged 3.0 to 4.0 mm in thickness. Microscopically, (figs. 2, 3) the walls were very edematous and heavily infiltrated by acute inflammatory cells. There was localized proliferation of the external mesothelial cells. An acute fibrinous exudate covered the external surface. Inflammatory exudate lined the abscess cavity.

#### SUMMARY AND CONCLUSIONS

A case is presented of a patient's ovarian abscess complicating pregnancy. Reports of such cases in the literature are rare. The patient was admitted to Fitzsimons Army Hospital on 30 July 1956, with a history of having experienced mild lower abdominal cramping and pelvic pain for approximately 9½ hours. She had been followed in the prenatal clinic at this hospital since 14 May 1956. On 3 August 1956, a pelvic examination revealed a large mass posterior and inferior to the uterus. The afebrile course of the patient added to the confusion in considering the preoperative differential diagnosis of a pelvic mass complicating pregnancy.

Due to the size and to the unknown nature of the tumor, surgical intervention was deemed necessary. The duration of ges-



Figure 2 Microscopic view of a section of the wall of the ovarian abscess.  
( $\times 75$ )

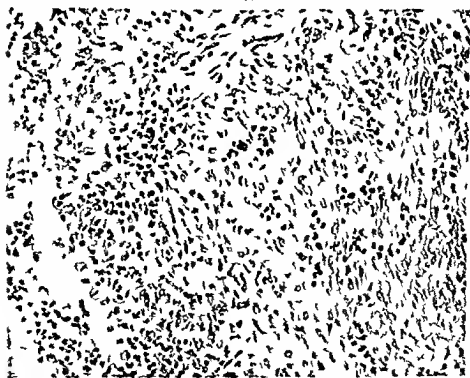


Figure 3. Higher-power view of a section of the wall of the ovarian abscess.  
( $\times 275$ )

tation was ideal for considering an operative procedure. With the use of penicillin and streptomycin sulfate during the preoperative and postoperative periods, a severe peritonitis was avoided even though accidental spillage of the contents of the abscess occurred at surgery. Whether parenteral progesterone was of value in the continuation of the pregnancy is debatable.

It was considered that the streptococcus organism was carried to the ovary by the hematogenous route but the actual date of the primary involvement of the ovary is not certain, and may have been in May 1956 when she had experienced pain in the right lower quadrant of the abdomen. By removing the abscess the future danger of its rupture was avoided. Rupture of the abscess could have occurred at any time during pregnancy, during labor, or during the postpartum course, and could have been fatal.

#### REFERENCES

1. Aitken L. Remarks on pelvic peritonitis and pelvic cellulitis with illustrative cases. In *Transactions of the Edinburgh Obst Soc* 2: 77-107 Mar 1870.
2. Coe H. C. Acute oöphoritis complicating pregnancy. *Am. Gynec J* 1: 670-678 Dec, 1891.
3. Briandeau, A. Salpingo-ovarites compliquant la grossesse. Vol. 9: 133 Jan-Mar 1917. *Arch. mens. d'obst. et de gynec* 9: 133 Jan-Mar 1917.
4. Paulini F. Rottura di ascesso ovarico intrapartum peritonite acuta. *Atti. Soc. ital. di ostet. e gynec* 35: 202-203 Mar-Apr 1939.
5. deLisi D. G. Gravidanza tubarica destra associata ad ascesso ovarico sinistro. *Atti. Soc. ital. di ostet. e gynec* 36: 226-231 Mar-Apr 1940.
6. Cumlin R. C. Ovarian abscess during pregnancy. *J. Obst. & Gynec. Brit. Emp.* 58: 1025-1027 Dec 1951.
7. Black W. T. Abscess of ovary. *Am. J. Obst. & Gynec* 31: 487-494 Mar 1936.

---

#### WHO FIGHTS DISEASE GLOBALLY

The yearly investment by the United States in WHO of about one cent per \$1 000 of national income, or less than the cost of a three cent postage stamp per capita, is small indeed when measured against the huge returns of increased productive labor, higher standards of living and world amity. WHO in its global fight against disease, is doing its share to bring this about in an unobtrusive but highly practical way. Such constructive programs of technical assistance and training designed to win the trust of the peoples of the free world can effectively supplement the armed might of military machines as guarantees of world peace.

—S. Z. LEVINE M. D.  
in *New England Journal of Medicine*  
p. 816 Nov. 11 1954

# Bilateral Bell's Palsy Complicating Infectious Mononucleosis

HALL G. CANTER *Captain, MC USA*  
WILLIAM R. SCHILLHAMER *Major MC, USA*

**N**OT INFREQUENTLY neurologic complications occur during the course of infectious mononucleosis. The following case of bilateral Bell's palsy complicating this disease is believed worthy of reporting as another illustration of this growing group of phenomena.

## CASE REPORT

A 24 year-old white man was admitted to this hospital on 27 August 1956 because of progressive fatigue of two weeks duration. The family history revealed that when the patient was an infant his father had committed suicide. For many years he had had recurrent mild, frontal headaches.

Two weeks prior to admission the patient noted the onset of progressive fatigue. Eight days before entry to the hospital he had chills and was feverish. The day before admission he was unable to carry out his duties of clerk-typist because of fatigue. On 27 August he noticed some swelling of the glands in the anterior part of his neck reported to the hospital and was admitted.

Physical examination revealed a well-developed and well-nourished white man who was in no acute distress. His temperature was 99.6°F, pulse rate 88 per minute and blood pressure 116/70 mm Hg. His tonsils were moderately enlarged and there was a small amount of exudate. Slightly enlarged tender lymph nodes could be felt in the anterior and posterior cervical, axillary and inguinal areas and the epitrochlear nodes also were enlarged. The spleen and liver were not palpated. The remainder of the physical examination was within normal limits.

Urinalysis and a serologic test for syphilis were negative. A roentgenogram of the chest was normal. The initial white blood cell count was 12,550 per  $\mu$ l with a differential of 27 per cent neutrophils, 66 per cent lymphocytes, 27 per cent of which were atypical, 6 per cent monocytes and 1 per cent eosinophils. The initial heterophil agglutination titer was 1:448. As noted in table 1, blood cell counts during the pa-

TABLE 1. Hematologic and serologic findings in patient with bilateral Bell's palsy complicating infectious mononucleosis

Date	Total white blood cells (per $\mu$ l)	Differential count (per cent)					Hemoglobin (grams per 100 ml)	Heterophil agglutination titer		
		Neutrophils	Lymphocytes	Atypical lymphocytes	Monocytes	Eosinophils		Without absorption	After guinea pig kidney absorption	After beef cell absorption
8-28-56	12,550	27	66	27	6	1	11.5			
8-28-56	12,500	42	54	35	3	1	12.0	1:118	1:274	neg
9-4-56	12,650	41	59	26	0	0	12.0	1:274	1:8	neg
9-7-56	5,250	55	40	6	3	2	16.0	1:112		
10-3-56	4,850	46	50	0	2	2	13.5	neg		
11-15-56	7,850	45	48	0	4	3	15.0	neg		

# Bilateral Bell's Palsy Complicating Infectious Mononucleosis

HALL G. CANTER *Captain MC USA*  
WILLIAM R. SCHILLHAMMER *Major MC USA*

**N**OT INFREQUENTLY neurologic complications occur during the course of infectious mononucleosis. The following case of bilateral Bell's palsy complicating this disease is believed worthy of reporting as another illustration of this growing group of phenomena.

## CASE REPORT

A 24-year-old white man was admitted to this hospital on 27 August 1956 because of progressive fatigue of two weeks' duration. The family history revealed that when the patient was an infant his father had committed suicide. For many years he had had recurrent mild, frontal headaches.

Two weeks prior to admission the patient noted the onset of progressive fatigue. Eight days before entry to the hospital he had chills and was feverish. The day before admission he was unable to carry out his duties of clerk typist because of fatigue. On 27 August he noticed some swelling of the glands in the anterior part of his neck reported to the hospital and was admitted.

Physical examination revealed a well developed and well nourished white man who was in no acute distress. His temperature was 99.6°F, pulse rate 88 per minute and blood pressure 116/70 mm Hg. His tonsils were moderately enlarged and there was a small amount of exudate. Slightly enlarged tender lymph nodes could be felt in the anterior and posterior cervical, axillary and inguinal areas and the epitonsillar nodes also were enlarged. The spleen and liver were not palpated. The remainder of the physical examination was within normal limits.

Urinalysis and a serologic test for syphilis were negative. A roentgenogram of the chest was normal. The initial white blood cell count was 12,550 per  $\mu$ l with a differential of 27 per cent neutrophils, 66 per cent lymphocytes, 27 per cent of which were atypical, 6 per cent monocytes and 1 per cent eosinophils. The initial heterophil agglutination titer was 1:448. As noted in table I, blood cell counts during the pa-

TABLE 1 Hematologic and serologic findings in patient with bilateral Bell's palsy complicating infectious mononucleosis

Date	Total white blood cells (per $\mu$ l)	Differential count (per cent)				Hemo- globin (grams per 100 ml)	Heterophil agglutination titer		
		Neu- rophils	Lympho- cytes	Atypical lympho- cytes	Monoc- ytes	Eosino- phils	without absorption	After guinea pig kidney absorption	After beef cell absorption
8-28-56	12 550	27	66	27	6	1	115		
8-29-56	12 500	42	54	15	3	1	120	1 148	neg
9-4-56	12 650	41	59	26	0	0	120	1 224	neg
9-7-56	5 250	55	40	6	3	2	160	1 112	
10-3-56	4 850	46	50	0	2	2	135	neg	
11-15-56	7 850	45	48	0	4	3	130	neg	



patient's hospitalization gradually returned toward normal. The heterophil agglutination remained positive although the titer decreased. The hemoglobin was 11.5 grams per 100 ml on admission and gradually rose to 16.0 grams. Liver function tests revealed an icteric index of 12.8 and the cephalin cholesterol flocculation test was 3 plus in 48 hours.

The patient was placed at bed rest and given 0.6 gram of acetyl salicylic acid every four hours as needed for headaches. On the day of admission he complained of frontal headache and during the next two to three days mentioned numerous symptoms including tightness of the facial skin and paresthesias of the legs and hands. He also expressed concern over the possibility that he might have a brain tumor or other serious or perhaps fatal disease.

The ear, nose, and throat consultant found no evidence of sinusitis. On 29 August a psychiatric consultant expressed the opinion that the patient had hypochondriasis and reassurance was given. Neurologic examination at this time was normal. On 30 August the patient developed bilateral seventh nerve palsy (figs. 1 and 2). The neurologic consultant considered at this time that the Bell's palsy was due to intracranial inflammatory process secondary to infectious mononucleosis. He believed that the prognosis for recovery was excellent.

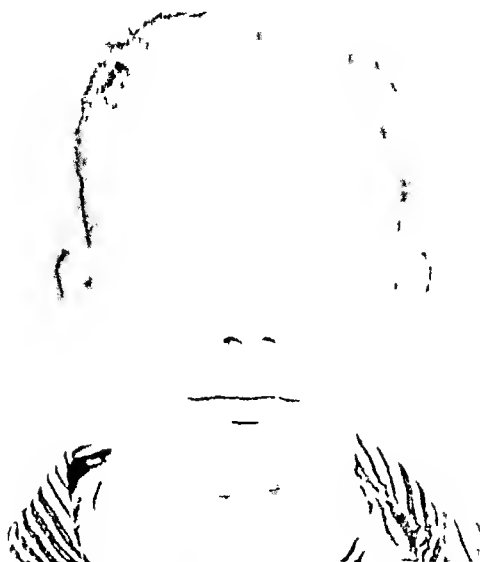
The patient continued to express hypochondriac complaints with numerous somatic symptoms and attempted to direct his own therapy. On 1 and 2 September he was given 60 units of corticotropin and on 3 and 4 September 40 units. There was no change in his clinical course with this therapy. He was given 50 mg of thiamine hydrochloride twice daily and 30  $\mu$ g of vitamin B<sub>12</sub> daily both subcutaneously. There was little change until 18 September when slight motion of the perioral muscles on the right was seen.

The patient was discharged to duty on 28 September and was followed as an outpatient. He was readmitted to the hospital on 2 October complaining of fatigue. No further abnormalities were noted and he was discharged on 6 October. A heterophil antibody test at this time revealed no titer. Over the next three or four months there was nearly complete return of function of the facial muscles. He was seen on innumerable occasions for many complaints, none of which were associated with objective findings.

## DISCUSSION

Bilateral Bell's palsy from any cause is a relatively rare phenomenon and as a complication of infectious mononucleosis is extremely rare. From a review of the literature we are able to find only two documented cases of bilateral Bell's palsy complicating this disease.<sup>3</sup>

In a recent extensive review of the complications of infectious mononucleosis by Smith<sup>4</sup> and a review by Bernstein and Wolff<sup>4</sup>



*Figure 1 The patient attempting to close his eyes*

emphasis was placed on the neurologic complications of the disease. The conclusion of those reviews is that the symptomatology and clinical findings of these neurologic complications are dictated by the site of maximal involvement, whether in the central or the peripheral nervous system. Bernstein and Wolff further stated that neurologic complications may be expected in less than 1 per cent of all cases of infectious mononucleosis. Landes, Roich, and Perlow<sup>3</sup> stated that the patient may first be seen with only neurologic abnormalities and the early diagnosis of infectious mononucleosis overlooked unless a heterophil agglutination is accomplished.

The case presented is illustrative of Bell's palsy complicating the course of infectious mononucleosis. We believe that nodes within the facial canal became involved in the inflammatory process of infectious mononucleosis and, because of the



Figure 2 The patient attempting to show his teeth and raise his eyebrows

resultant pressure in a closed space, caused bilateral seventh nerve paralysis. It is interesting that both seventh nerves were affected simultaneously. The patient was given a short course of corticotropin and thiamine hydrochloride and vitamin B<sub>12</sub> parenterally without apparent change in his clinical course. Recovery has been essentially complete.

#### SUMMARY

A case of bilateral Bell's palsy complicating the course of infectious mononucleosis in a young white male is recorded. Recovery in this case was uncomplicated. The course of the disease was apparently unaffected by steroid and vitamin therapy.

#### REFERENCES

1. Crutcher, N. E. Infectious mononucleosis with polyneuritis (Guillain-Barre syndrome). Report of case with facial diplegia treated with 2-3 dimethyl p-aminobenzoate.

(BAL) *J. A. M. A.* 143:214-215 May 9 1950

2. Czell O. Meningitis serosa des Hefferschem Drüsenfieber (Mononucleosis infectiosa). *Deutsche med. Wochenschr.* 63:1759-1762 Nov 19 1937 Cited in reference 4

3. Smith, J. A. Jr. Complications of Infectious mononucleosis. *Ann. Int. Med.* 44:861-873 May 1956

4. Bernstein T. C. and Wolff H. C. Involvement of nervous system in infectious mononucleosis. *Ann. Int. Med.* 33:110-1138 Nov 1950

5. Landes R. Reich J. I. and Perlow S. Central nervous system manifestations of Infectious mononucleosis report of case. *J. A. M. A.* 116:249-2484 May 31 1942

### CARE IN TERMINAL ILLNESS

Prolongation of life, merely for the sake of a brief postponement of death, does not appeal to me. Sometimes it is difficult to know when further treatment becomes useless. On the other hand, there are many times when we do know and can predict the outcome if either of two alternative courses is selected. Typical of this situation is ureteral obstruction in terminal carcinoma of the cervix. Uremia is a common cause of death with cervical carcinoma. Moreover, it represents a gradual fading and dimming of consciousness, and to me would seem to be an easy and painless way to die. Nevertheless, there are those who would perform cutaneous ureterostomy or pyelostomy on such patients. This might prolong life by six months and certainly would restore the patient to consciousness and awareness of her surroundings. But, what does she pay for these six months? At least the terminal two or three weeks will be associated with great pain and any or all of the disagreeable symptoms of late cervical cancer. I would not wish this for a loved one if the alternative were a relatively easy and painless death hastened perhaps a few months.

On the facade of the Union Station in Washington, D. C. is carved in granite, the admonition, "Speed the parting guest." I do not quote this as a plea for euthanasia. It is a plea to the physician to refrain from unnecessary heroics. When confronted with a rational and sentient patient, about to embark upon the final phase of his terminal illness, the physician should ask himself the question, "If I were the patient, what would I want done to me?"

—WILLIAM F. MENGERT, M. D.  
in *Illinois Medical Journal*  
p 100-101, 102, Sept 1957

# Ganglioneuroma

RICHARD C SCHULTZ, *Captain MC USA*  
PHILIP J NOEL, Jr. *Colonel MC USA*

**G**ANGLIONEUROMA was first described by Loretz<sup>1</sup> in 1870 in a thoracic sympathetic chain however, according to Fung<sup>2</sup> the entity was prophesied by Virchow about 1865. The tumor is defined as a rare, benign tumor composed of differentiated sympathetic ganglion cells mixed with great numbers of nerve fibers sheathed by Schwann cells. Although the tumor is considered benign a ganglioneuroma with metastasis to lymph nodes was described by Miller<sup>3</sup> in 1908 and corroborated by Beneke<sup>4</sup> and Berner.<sup>5</sup> Neuroblastoma is the malignant counterpart of the tumor. The tumor is most common in young adults, with a slight preponderance in women.<sup>6</sup> Generally the common sites of origin are one third in the adrenal medulla one third in the abdominal and pelvic sympathetic chains, and one third from the cervical sympathetic chains and scattered in other sympathetic chains.<sup>7</sup> Willis<sup>8</sup> believed that the ganglioneuroma originates in the fetal or early postnatal period as a neuroblastoma and then matures into a ganglioneuroma. He also believed that there is always a malignant potential to this tumor.

## CASE REPORT

A 20-year old white soldier presented himself at a dispensary with complaints of constipation and weight loss since induction into the Army 4 months previously. The amount of weight loss had been approximately 12 to 15 pound. He had been conscious of a mass in the right lower abdominal quadrant which had not been tender or painful for several weeks prior to seeking medical attention. He denied the passage of any blood in his bowel movements or tarry stools. There had been no change in the size of his stools or in his bowel habits. He had not experienced anorexia, malaise, chills, fever or night sweats. Upon questioning the patient admitted that he had been aware of bilateral swelling in the supraclavicular fossae for 6 or 7 years. He denied any local or radiating pain into his arms. There was no dysfunction of the upper extremities nor were there symptoms referable to the head or neck. He denied paresthesia and muscular weakness of his extremities.

---

From U. S. Army Hospital 1 Fort Carson, Colo.

**Past History** The past history was essentially negative. The patient was a student, prior to being inducted into the service from Kansas City, Mo., on 28 February 1956. His first duty assignment was at Fort Carson, Colo., where he arrived on 8 March 1956. His mother, father, and sister are living and well. Family history of cancer was negative. The patient had the usual childhood illnesses and knows of no serious illnesses in adult life. There had been no operations and no injuries that he could recall.

The system review was entirely negative except for the musculoskeletal system. Here, the patient admitted to having had a mild, low back pain for approximately three years without apparent cause. His pain was without radiation and seemed to be unrelated to activity. He denies any muscular weakness.

**Physical Examination** This tall, slender, young adult white man was in no acute or chronic distress and appeared well oriented and alert. His admission weight was 154 pounds, height, 6 feet 1 inch, temperature, 98.6°F, pulse rate, 80/min, and blood pressure 110/70 mm Hg. There were firm swellings in both supraclavicular fossae which had the appearance of being hypertrophied trapezius muscles. There was no tenderness in the area. There was a full range of cervical spine motion. The eyes were normal. The fields of vision were normal, and fundoscopic examination was negative. Ears, nose, throat, and mouth were negative. The chest was normal. Lungs were clear to percussion and auscultation. Heart borders were within normal limits. There was a regular sinus rhythm and no murmurs were heard. There was a slightly tender, round, partially movable mass of approximately 4 cm by 4 cm in the right lower quadrant in the cecal area. There were no palpable hernias. The genitalia were normal. Adult male with testes descended bilaterally, and digital examination of the rectum revealed normal sphincter tone. There was no mass within the rectum, but the examining finger could palpate a firm, nodular mass that seemed outside the rectum, but was pressing firmly against it. No hemorrhoids were visible. The prostate was normal to palpation and there was no tenderness. Examination of the back revealed normal spine, and a full range of motion was performed without pain. There was no tenderness to palpation of the spinous processes, and the long muscles were not in spasm. Examination of the extremities revealed a full range of motion with normal muscular strength. Neurologic examination was essentially negative, reflexes were grossly normal and no pathological reflexes were elicited. There were no palpable lymph nodes. Initial clinical impressions were that there might be either a carcinoma of the cecum or an appendiceal abscess.

**Laboratory Studies** Hemoglobin was 16.4 grams per 100 ml, leukocyte count was 8,500/ $\mu$ l, with 56 per cent segmented neutrophils, 36 per cent lymphocytes, 4 per cent band forms, and 4 per cent eosinophils. The admission urinalysis was negative. Qualitative cardiolipin microflocculation test was negative.

On admission chest and upper gastrointestinal roentgenograms were within normal limits. The small bowel studies showed elevation of the ileum in the right lower quadrant by an extrinsic mass (fig 1). Barium enema demonstrated slight elevation of the cecum and displacement of the rectum to the left by a rounded extrinsic mass (fig 2). Excretory urography showed lateral and anterior displacement of the right ureter just above the brim of the bony pelvis. Distal to this the right ureter was not visualized. The right side of the bladder did not fill because of extrinsic pressure from the right and posteriorly (fig 1). The impression was gained from this study that there was a right-sided mass arising from deep within the pelvis and extrinsic to the gastrointestinal and genitourinary tracts. The displacement of the bladder precluded retrograde urography. There was no roentgenographic evidence of bony involvement of the pelvis or sacrum. There was no calcification in the mass. Retroperitoneal sarcoma or sarcoma arising from the prostate were then considered in the differential diagnosis.

Roentgenograms of the cervical and supraclavicular soft tissue revealed bilateral soft tissue masses in the base of the neck. No cal



*Figure 1 Small bowel study showing superior displacement of the intestines. By excretory urography the bladder is demonstrated as filling on the left side only.*



Figure 2 Barium enema showing the displacement of the rectum to the left by an extrinsic mass

ifications were seen in these masses. The cervical spine films revealed gross enlargement of all neural foramina bilaterally, more marked on the left (fig. 3). It was noted that these neural foramina were rimmed by a thin line of sclerosis which would indicate that the dilatation had been a long, slowly developing process. The vertebral bodies appeared to be intact otherwise. The bony bridges between the neural foramina were markedly thin, especially on the left side. A slight increase in the cervical curvature was noted in the lateral view. Survey films of the thoracic and lumbosacral spine revealed a slight enlargement of the neural foramina to T2 and T5. Repeat chest films during the hospital course were consistently negative.

**Course in Hospital.** At the time of admission a proctoscopy was performed which was essentially negative except for a pronounced displacement of the rectum to the left by an extraneous mass. On the ninth hospital day a laparotomy was performed, and a large retroperitoneal mass presented itself in the lower right portion of the pelvis. The liver was grossly normal as were the spleen and stomach. The entire small and large bowel were examined and appeared to be normal. There were palpable shot like nodes in the root of the mesentery of





Figure 3 (A and B) Oblique views of the cervical foramina showing marked enlargement bilaterally

the small bowel along the aorta. While the mass appeared to be adherent to the urinary bladder it did not extend into it and separated relatively easily. A frozen section was made from the mass and although the pathologist could not identify the tumor he thought it might be a myxoma. He stated that it did not appear malignant but that he could not describe it positively as benign. He stated that it did not appear to be an epithelial tumor or a lymphoma.

A separate similar mass was located near the bifurcation of the aorta and the mass seemed to encircle the proximal portion of the rectum.

It was decided clinically that the tumor was of a benign nature and was spreading by local enlargement rather than infiltration and that as much of the tumor mass as possible should be resected. The greater portion of the tumor which presented in the pelvis on the right side was dissected from the urinary bladder and removed in one piece (fig 4). Other discrete tumor nodules were dissected from the pelvic wall at the bifurcation of the aorta, the hollow of the sacrum where they pressed on the rectum and from the base of the urinary bladder (fig 5). It was impossible to remove all the tumor tissue without mutilation of functioning structures. An abdominal perineal procedure was considered but was dismissed due to the probable benign nature of the lesion. Penrose drains were placed retroperitoneally and also between the rectum and coccyx and extending up into the hollow of the sacrum. Stay sutures were used in closure of the abdominal wall.

The final histologic diagnosis from regular prepared slides was that of a well differentiated ganglioneuroma without neuroblastomatous elements (figs 6 and 7).



Figure 4. View of the partially encapsulated lobular mass from pelvic region  
note multiple surface projections. Tumor has been cut to show appearance  
inside of capsule

Postoperatively, the patient recovered well, and there was very little drainage. The patient, however, had no anal sphincter control, and the urinary bladder remained on Foley catheter drainage as he was unable to void. All sutures were removed on the twelfth postoperative day. Periodically throughout the postoperative course, the bladder was filled with sterile saline to the point of discomfort, but the patient remained unable to void. On the thirty seventh postoperative day the patient voided spontaneously but incompletely. A urinary residual



*Figure 3 These specimens represent some of the rather discrete nodular partly encapsulated tumor masses dissected from around the bifurcation of the aorta, rectum and base of urinary bladder*

and cystitis were treated with antibiotics and Urecholine Chloride (brand of bethanechol chloride) and finally with continuous catheter drainage.

After satisfactory recovery from the laparotomy including recovery of anal sphincter tone and ability to have controlled bowel movements attention was turned to investigation of the supraclavicular masses. Previously taken roentgenograms revealed soft tissue densities in both supraclavicular areas and oblique views of the cervical vertebrae revealed markedly enlarged neural foramina bilaterally (fig. 3) with notable increase in cervical lordosis. On the fifty-fourth postoperative day a biopsy specimen was taken under local anesthesia from an enlarged nerve trunk of the right brachial plexus. At the time of biopsy the patient experienced a numb sensation to the right thumb. The pathologic diagnosis from this biopsy was reported as normal nerve tissue of the brachial plexus and normal supraclavicular fat pad on the right. The site of biopsy healed without complications.

Follow up cystometrograms revealed weak detrusor power of the urinary bladder the primary dysfunction being in the voiding pressure probably due to partial bladder denervation. Continuous catheter drainage was maintained. While on antibiotic therapy for urinary residual and cystitis the patient developed a bilateral axillary hidradenitis which did not respond to changes of antibiotics or soaks. Repeated cultures of these pustules produced no growth. Prior to the meeting of the Medical Board for medical discharge from the Army the patient



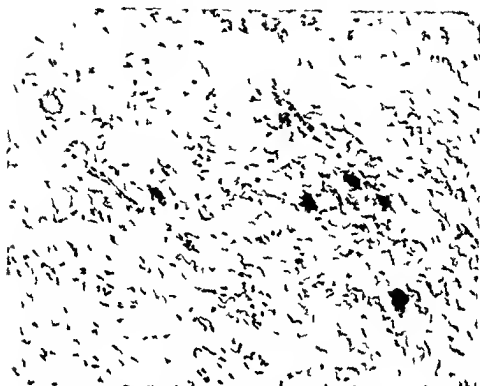
Figure 6 Representative area shows adult sympathetic ganglion cells in a neurofibromatous stroma. ( $\times 80$ )

had regained a considerable amount of weight and was asymptomatic except for his lack of ability to empty completely his urinary bladder. The bilateral hidradenitis subsided to some degree. The gastrointestinal system was functioning adequately, and all wounds were healed.

The patient was transferred to a named Army General Hospital from which he was discharged to inpatient care at a Veterans' Hospital near his home.

#### COMMENTS

In January 1956, Scovillo, Poleyn, and Dunsmore<sup>4</sup> described intraspinal ganglionouroma as extremely rare, dumbbell in shape, with connections extending through the intravertebral foramina. In differentiating between the paraspinal and intraspinal origins of ganglioneuroma, they pointed out that when the origin is paraspinal, the invasion into the spine is generally through only one



*Figure 7 Photomicrograph of characteristic area composed of many Schwann cells and several fully differentiated ganglion cells sheathed by satellites ( $\times 150$ ) (Courtesy of Armed Forces Institute of Pathology)*

or two foramina if intraspinal in origin, extension outward is usually through multiple foramina. There were no specific symptoms in the differentiation of these two origins. Powlands and Baird<sup>9</sup> pointed out that mediastinal ganglioneuroma may have a cervical extension presenting as a swelling above the clavicle or sternum.

In our case it was decided that the tumor probably had two separate origins: origin from the pelvic sympathetic plexus, and based on roentgenographic evidence alone, a cervical intraspinal origin.

### CONCLUSION

A case of ganglioneuroma with two probable sites of origin in a young recruit has been presented. The surgical treatment and disposition of this patient have been outlined and several points of interest from the medical literature related to this particular case have been given. It should be pointed out that roentgen ray therapy plays no part in the treatment of this tumor.

**ACKNOWLEDGMENT** The authors are grateful to Lt Col Prince D Beach, MC USA Maj Robert F Dillon, MC, USA and Capt Henry T Uhrig, MC, USA for their assistance in preparing this case for presentation

#### REFERENCES

- 1 Lotetz W Ein Fall von gangliösem neurom (ganglion). *Verebous Arch. f path Anat* 49 435-437 1870
- 2 Ewing J *Neoplastic Diseases treatise on tumors* 4th edition W B Saunders Co Philadelphia Pa 1941 pp 479-483
- 3 Miller J W Ein Fall von metastasierendem Ganglioneurom *Verebous Arch. f path. Anat* 191 411 421 1908
- 4 Beneke R Zwei Fälle von Ganglioneurom *Beitr path. Anat* 30 1-48 1901
- 5 Bernet J H. Ein Fall von malignem Ganglioneurom *Beitr path Anat* 203-208, 1922
- 6 Anderson W A D (editor) *Pathology C. V Mosby Co St. Louis Mo* 1948. pp 1102 1384
- 7 Willis R. A. *Pathology of Tumours C. V Mosby Co St. Louis Mo* 1948 pp 843-871
- 8 Scoville W B Polcyn J L and Dunsmore R. H Spinal ganglioneuromas and results and differential diagnosis *J Neuropath. & Exper Neurol* 15 85-92 Jan 1956
- 9 Rowlands B C. and Daird I M Ganglioneuroma of lumbar sympathetic chain report of case *A. M. A. Arch. Surg* 69 607 611 Nov 1954

#### BEER BELLY

"Spontaneous rupture of the oesophagus, unconnected with trouble in the central nervous system can occur when vomiting follows draughts of beer on a Saturday night Incoordination in the normal mechanisms of vomiting may be due to reflex failure caused by disease of the central nervous system relayed to the autonomic system or to its befuddlement by alcohol so that the vomit cannot escape rapidly through the gullet Certainly the lesion from both causes is the same—a linear tear in the lower third of the oesophagus nearly always on the left side Perhaps the cricopharyngeus is a split second late in relaxing above the uprising thus forming another kind of glottal stop "

—ANNOTATIONS

in *Lancet*

p 29 7 July 1956

# Relation of Military Assignment to Choice of Conversion Symptoms

JEAN LYLE *Captain MSC USAR*  
JOSEPH BERCHMANS RIOUX *Captain MC AUS*

**C**ONVERSION hysteria is an intriguing nosologic entity in which there is a transfer of an unconscious conflict from the psyche to the soma. This process of materialization not only diminishes the intensity of the conflict but at times makes it evident that the conflict could be touched while in the body. Those who are afflicted appear to be more than normally impressed by physical disease in themselves and in others. In facing adversity they would modify their own bodies instead of external reality by presenting striking imitations of organic illnesses.

This article deals exclusively with one aspect of the phenomenon namely the choice of physical symptoms, and attempts to answer one question. Why, of all the organs available in the organism, is one chosen in preference to another for the reception and expression of an unconscious conflict? A typical case history as exemplified in a given military assignment is reported as an illustration.

In the literature explanations for the choice of physical symptoms in conversion have been given the generic term of somatic compliance. As far as can be estimated the body complies somatically to the reception of a conflict in one of the following ways. First by reason of congenital defect, accident or disease a part of the body may become an easy receptor of conflicts. According to Ferenczi<sup>1</sup> the function impaired by conversion hysteria is likely to be the one least important to the patient. Second, the opposite can be true. A part of human anatomy may fall prey to conversion when its maximum physiologic activity coincides with the emergence of an unconscious conflict. Thus, foot soldiers who have to make the greatest use of their legs may, under stress of combat, become paralyzed and unable to walk. Janet<sup>2</sup> believed that the function impaired by conversion hysteria is the most important one to the person. Finally, psychoanalysts emphasize the symbolism of certain organic functions which favors the acceptance of unconscious conflicts. It is known that

the mouth more adequately expresses dependence needs, while activity of the bowels better conveys the idea of hostility. "Con vex" organs according to Fenechel,<sup>3</sup> symbolically represent the male organ and male aspirations. As a consequence it could be said that, in the male, paralysis of the hand signifies the degradation of his manhood.

Ferenczi's theory is in closer connection with the case we report. Noting the prevalence of left sided hysterical paralysis among right handed people, Ferenczi concluded it was due to the fact that the left side was already partially disengaged from the patients' conscious activities and consequently "more accessible to unconscious impulses." According to other authors, the left side would be preferred by the process of conversion because it symbolically means *wrong* when the right means *correct*.

Without contesting the validity of the above views, an additional explanation is offered for the choice of physical symptoms in conversion hysteria. It is tentatively formulated as follows. All other conditions satisfied, a bodily function could become hampered by the process of conversion because of its very importance to the fulfillment of a given duty, while being at the same time the least important to the performance of an individual as an individual. For instance, it has been observed that combat sergeants and lieutenants who have to issue verbal commands develop hysterical aphonia in preference to other forms of hysteria. With infantrymen, the preference is for paralysis of legs, or for lower back syndrome, otherwise known as *camp locomotion*.<sup>4</sup> Airplane pilots for whom vision is essential more readily become the victims of hysterical blindness. Among civilians, occupational neuroses, like writer's cramp and miner's nystagmus, are other examples of the same condition.

Although removed from their area of conflict by the development of conversion, these individuals usually are returned to a modified form of duty or occupation after recovery. Such persons seem to suffer enough mental anguish to become incapacitated in one but not all forms of occupation. In other words, their ability to assume a less important job after recovery tends to prove that their suffering with conversion in the original job setup was minimal and not pronounced enough to bar recovery, in contrast to their maximal incapacity of performance.

The ocular manifestations of hysteria in relation to flying were studied extensively by Ironside and Batchelor.<sup>5</sup> They reported that these disabilities as well as their accompanying complaints were in terms of performance of duty. For example, patients often complained that they were no longer able to judge distances when flying in formation or when landing. This manner of complaining is characteristic of hysteria. Rather than expressing pain or



suffering the patients themselves ordinarily expound their inability to do a job. Indeed the idea of the job appears to be paramount in their preoccupations. In the present case, in view of the patient's assignment as a military policeman, it is believed that the paralysis of the right hand was an appropriate somatic compliance for the physical expression of a psychic conflict.

### CASE REPORT

A 29-year old left handed sergeant assigned to the Military Police was admitted to this hospital on 2 October 1956 because of inability to extend his right hand. Due to this disability his commanding officer had found him unfit for duty.

This soldier had many reasons to want to stay in the Army. He had had considerable experience in the military. From 1945 to 1948 he had served satisfactorily as an infantryman and had been discharged a corporal. In 1953 he joined the National Guard and was soon promoted to the rank of sergeant. Recent layoffs in his seasonal work as a laborer had prompted him to consider the attractions of active duty. For this father of five children these attractions were in terms of financial security and opportunity for advancement.

In rejoining the Army his plans were for returning to the Infantry and the familiarity of its routine where because of his past experience he could more easily retain his rank of sergeant. After a few weeks in a refresher course at a basic training center he gained confidence by again performing in the Army and looked forward to a permanent Infantry assignment. Instead he was assigned to the Military Police.

This came as a great shock and disappointment. He felt inadequate as a military policeman and became concerned about the preservation of his rank. He complained to the assignment section in the following terms: "I cannot see myself with a military police assignment. I know nothing about it. I want to be in the Infantry where I know my work and can teach classes." He was ordered to report to his duty station after a short leave.

The day prior to returning to duty he awakened with a paralysis of his right hand and went to a military dispensary for treatment. He reported and saluted the medical officer who noted that on saluting the patient let his right hand fall amiss without any control. The hysterical nature of this condition was easily established by the absence of organic findings and the patient was ordered back to duty. Two days after his arrival at his station he saluted his commanding officer with an awkward gesture and was ordered to the hospital with a suggestion of an assignment other than the Military Police.

The past history of this patient revealed that as far back as he could remember he had been inadequate and insecure. He quit school for fear of failure in spite of his teacher's expectation that he would attend college. His choice of work was for menial labor which was

inferior to his natural endowments, but assured him of fruitless performance

Upon admission to the hospital, the patient emphasized his inability to do duty because of paralysis of his right hand. He complained "I cannot salute and I cannot handle a gun with this hand. It has to be treated!" In the general plan of treatment, however, his hand was practically ignored. Physical therapy was prescribed, but as a device for the patient to save face in front of his fellow patients. Psychotherapy also was necessary.

It was considered that external manipulation by returning this military policeman to the Infantry would restore his normal state of health. After official confirmation of his resignation by the military authorities, the patient's improvement became obvious. He announced that he could extend his hand again. His treatment was completed with further psychotherapy, and after two and a half months of total hospitalization he returned to duty confident of his ability to carry on in the Army as a combat infantry sergeant.

### DISCUSSION

We have mentioned that a paralysis of this patient's right hand was an appropriate somatic compliance for the reception of a psychic conflict centered around his duties as a military policeman. Although it would have been possible for this soldier to display another form of conversion hysteria, it would have required a conflict in another area. It is inconceivable that his becoming blind like an airplane pilot, or paralyzed like a foot soldier, could have solved his problems. Even paralysis of his left hand would have been illogical and ineffective. In that event, the chances are that the military policeman would have remained on duty and, being left handed, he would have suffered in vain.

The patient's conflict was connected with his job, where his self-esteem and financial security became endangered by anticipated failure and consequent reduction in rank. The only way out of this situation was by inability to perform the necessary duties of saluting and handling a gun with his right hand. This meant that he could not carry out important functions of a military policeman. In addition, as an individual, his right hand was the least important of the two, being left-handed, he was able to satisfy his customary needs. His choice of symptom was indeed the least disadvantageous and at the same time the most rewarding. At the expense of only minimal discomfort, the patient achieved a maximal benefit by the removal of an anxiety-producing situation.

### SUMMARY

A case of hysterical paralysis of the right hand in a left-handed military policeman is presented, and the specific form taken by

the disease in relation to the assignment is stressed. An important function of the assignment and the function least important to the individual—use of the right hand—fell prey to the process of conversion. The choice of this hysterical symptom seems to have been determined by the maximal benefit gained in return for the minimal discomfort suffered under the condition existing.

#### REFERENCES

- 1 Ferenczi S. *Further Contributions to the Theory and Technique of Psycho-Analysis*. Compiled by John Rickman. author translated by Janet S. Ferenczi and others. Hogarth Press Ltd, London, 1950 pp 115-21, 22, 89-118.
- 2 Janet P. *Major Symptoms of Hysteria*. The Macmillan Co. New York N Y 1907 pp 319-337.
- 3 Fenichel I O. *The Psychoanalytic Theory of Neurosis*. W W Norton & Co. Inc. New York N Y 1945 pp 13-14, 183, 224-228.
- 4 Belgrano V and Giordano G B. *Sulla camptocormia*. *Rev. neurol.* 79: 25-35 Jan. 1947.
- 5 H. Miller P. *Camptocormia, hysterical bent back of soldiers: report of 2 cases*. *Mil. Surgeon* 92: 295-300 Mar 1943.
- 6 Iroside R and B. Schelor I R C. *Ocular manifestations of hysteria in relation to flying*. *Brit. J. Ophth.* 29: 68-98 Feb 1945.

---

#### THE GP AND AVIATION MEDICINE

Airline passengers almost never come in contact with the aviation medical specialist and for good reason he is concerned with the medical and allied problems of aviation—to make flight safer, more reliable and more comfortable for more people. Medical practitioners in private practice are the ones to whom prospective passengers turn. Several excellent texts and references on aviation medicine are readily available. Chief among these are Armstrong's "Principles and Practice of Aviation Medicine," McFarland's "Human Factors in Air Transportation," "Aviation Medicine Practice" prepared by the Bureau of Medicine and Surgery of the Department of the Navy and the U S Air Force's "Flight Surgeon's Manual."

—FREDERICK S SPIEGEL, Lt Col USAF (MC)  
in *Journal of the American Medical Association*  
p 208 Sept 21 1957

## A MESSAGE FROM THE A M A

During May and June, the House and Senate Joint Committee on Atomic Energy held eight days of public hearings on the nature of radioactive fallout and its effects on man. The hearings covered, in detail, the whole cycle of fallout from its inception in the detonation of nuclear weapons, through its scattering about in the atmosphere and descent to earth, and finally its uptake by and effect on human beings, animals, and vegetation. Some fifty experts were invited to present scientific testimony ranging from physics to pathology and from geology to genetics, as it relates to fallout.

One point the Committee was interested in was whether scientists, many of whom are employed by Government agencies, felt free to work and exchange information in the sciences related to fallout. The weight of the testimony was that such freedom exists. Another point the Committee was interested in, and one on which the testimony was not so satisfying, according to the Committee report, is whether or not information on fallout and its effects is reaching the public. Information on the biological effects of radiation has been presented to the public in widely read reports by the British Medical Council and by the National Academy of Sciences. These reports contain some information directly applicable to the fallout question.

In its summary of key points, the Joint Committee outlined seven general observations made on the results of the hearings. They are as follows:

1 **Origin of Fallout** It was pointed out that all nuclear explosions can be expected to produce some radioactive materials. However, certain kinds of explosions produce very much less radioactivity than others. Although there is no such thing as an absolutely "clean" weapon (that is, there is no such thing as a nuclear weapon detonation completely free of accompanying radioactivity), the amount of the radioactivity produced can be substantially altered in relation to the size of the explosion.

2 **Distribution of Fallout** There was substantial, but far from complete, agreement on what happens to radioactive debris produced in man's environment, how much is there now, how and

From the Council on National Defense of the American Medical Association. The views and opinions expressed are not necessarily those of the Department of Defense.

—Editor

where it is distributed, and how much is in man himself. There was considerable evidence presented to indicate that in no part of the atmosphere is fallout uniformly distributed and that, therefore, the effects of fallout on the world's population could not necessarily be expected to be uniform.

**3 Biological Effects of Radiation** There was general agreement that any amount of radiation no matter how small a dose, increases the rate of genetic mutation in a population. There was on the other hand, a difference of opinion as to whether a very small dose of radiation would produce, similarly, an increased incidence of such somatic conditions as leukemia or bone cancer, or a disease of life expectancy, in a population.

**4 Tolerance Limits** There was general agreement that there is a limit to the amount of radioactivity and, hence, to the amount of fission products that man can tolerate in his environment. The extent to which existing and future generations will be affected by man made radiation was shown to be intimately tied to certain decisions, moral as well as scientific.

**5 Effects of Past Tests** It was clearly shown that man's exposure to fallout radiation, including strontium 90, is and will be in general small, *for the testing already done*, compared with his exposure to other "normal background" sources of radiation (a fraction of 1 to 10 per cent), and even compared with variations in "normal background" sources. But it was not agreed on how this information should be interpreted.

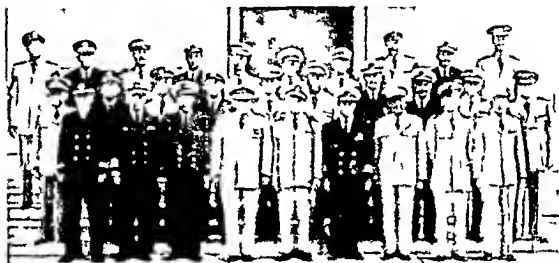
**6 Effects of Future Tests** There were differences of opinion on how to forecast the consequences of further testing. The differences hardest to reconcile appear to be those concerning the biological effects of radiation. Pending a resolution of differences, it would appear from the information presented, that the consequences of further testing over the next several generations at the level of testing of the past five years could constitute a hazard to the world's population.

**7 Effects of Nuclear War** The catastrophic nature of the radiation effects from a multi weapon (atomic and hydrogen bombs) attack on the United States were clearly portrayed. Thus, of course, could be applied to any nation.

The 19 page Committee print of the report entitled "Summary Analysis of Hearings May 27 29 and June 3 7, 1957 on the Nature of Radioactive Fallout and Its Effects on Man" was printed by the U S Government Printing Office for the use of the Joint Committee on Atomic Energy. Those desiring a copy of the report may make request through this source and reference.

## MEDICAL OFFICERS OF 16 COUNTRIES GIVEN GRADUATE COURSE BY NAVY

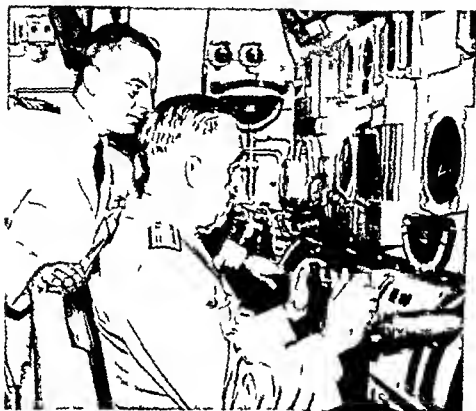
Twenty eight medical officers from the navies of 16 friendly nations on 8 November will complete a two months' graduate course in medical management and preventive medicine at the U S Naval Medical School, Bethesda, Md. The courses are being given under the supervision of Captain Calvin B Galloway, MC, USN, commanding officer of the School, under the Mutual Security Program.



First row left to right Lt Noriyuki Fujisaki Japan, Capt Chul Yu, Korea, Lt (jg) Tezel Burbanettin Turkey, Capt Prakob Chakurok, Thailand, Lt Luis Morel Dominican Republic, Comdr Luis Bello Vargas Peru, Col Hospicio L. Solidum Philippines, Lt S T Wang Taiwan, Maj Avelino U Tayog Philippines. Second row left to right Capt Virgilio S Zomara Philippines, Lt Comdr Mitsuo Wochi Japan, Lt Comdr Kyong Ilan Chong, Korea, Col Luigi Camponelli Italy, Lt Comdr Joaquin Diaz Gonzalez Roca Mexico, Lt Laborde Edg Titus Haiti, Lt Comdr Kamil Kusuoğlu Turkey, Lt Comdr Necati Keskin Turkey, Comdr C Y Su, Taiwan, Comdr Carlos Cepedo Chile. Third row left to right Capt. Calvin B Galloway MC USN commanding officer U S Naval Medical School, Comdr Akira Takagi Japan, Lt Antonio Venegas Chile, Lt Enzo Tarani Italy, Lt (jg) Francisco J Garcia Puig Cuba, Commodore Johan Greve-Brun, Norway, Lt Senl Wattasingh Thailand, Comdr Hans Bierbaum Germany, Comdr Orban Mordalga, Turkey, Lt Comdr Bruce W Halstead MC USNR staff officer U S Naval Medical School. (Lt (jg) V N Ha, Viet Nam is not in the photograph.)

Didactic work is being supplemented by visits to numerous military and civilian installations. The students were graciously received by the Honorable Dr Frank B Berry, Assistant Secretary of Defense (Health and Medical), and were impressed by the complexities of operations observed in the Pentagon. They also visited the clothing center of the U S Marine Corps and the U S Army at the Quartermaster Corps Depot, Philadelphia, Pa., the U S Naval School of Aviation Medicine, Pensacola, Fla., the experimental diving unit of the Naval Gun Factory, Washington, D C., and the United Nations building in New York.

## ADMIRAL HOGAN VISITS U S S SEAWOLF



Rear Admiral Bartholomew W. Hogan (right), Surgeon General of the U S Navy and Chief of the Navy's Bureau of Medicine and Surgery, is shown aboard the nuclear powered submarine *Seawolf* recently in Groton Conn, as Lieutenant Commander John H. Ebersole the ship's medical officer, demonstrates the airplane type controls used in the control room. Admiral Hogan also paid informal visits to the U S Naval Medical Research Laboratory and the Station Hospital, Submarine Base, during his stay in New London, Conn.

Admiral Hogan was elected to the Board of Trustees of the American Hospital Association at the 59th annual meeting in Atlantic City N J. He has served as delegate at large of the American Hospital Association and as a member of the American College of Hospital Administration.

## GENERAL HEATON HONORED BY BRAZILIAN OFFICERS IN WALTER REED CEREMONY



Brigadier General Arthur Augusto Alcantara, Commanding General of the Central Hospital of the Army, Rio de Janeiro (left) and Colonel Paulino DeMello, Director of the Policlínica of the Army, Rio de Janeiro (right) recently presented a medal and diploma of honorary membership in the Brazilian Academy of Military Medicine to Major General Leonard D. Heaton, Commanding General of Walter Reed Army Medical Center. The Brazilian medical officers visited Walter Reed as part of a three week orientation and observation tour of the United States. Major General Silas B. Hays, the Surgeon General, U. S. Army, also was presented a medal of honorary membership at a ceremony in his office.

After leaving Washington, General Alcantara and Colonel DeMello visited DeWitt Army Medical Center, Fort Belvoir, Louisville (Ky) Medical Depot, Army, Denver, and the Brooke Army Medical Center, Fort Brooke, Texas.



## OFFICIAL DECORATIONS

The following awards have been announced by Departments of the Navy and Air Force since 1 August 1957

### Legion of Merit

Wayne O Kester Brig Gen USAF (VC)      Edward J Tracy Brig Gen USAF (MC)  
Olin F McIlroy Maj Gen. USAF (VC)      Mitchell M. Young Col USAF (MSC)

### Distinguished Flying Cross

David G Simons Maj USAF (MC)

### Soldiers Medal

Walter A. Poznański Capt USAF (MC)

### Commendation Ribbon

Francis A. Chevrefil Comdr MSC, USN      Robert R Miller USAF (VC)  
Elmer A. Lodmell MC USA      Francis W Pruitt, MC, USA  
Willie C. Mason 3 Col. USAF (MSC)

---

First Oak Leaf Cluster

---

## DEATHS

COOPER Robert Arthur Captain MC USN of San Diego Calif stationed at the U S Naval Hospital San Diego graduated in 1930 from the University of Minnesota Medical School Minneapolis Minn appointed Lieutenant (junior grade) 13 June 1930 died 8 September 1957 age 50 in San Diego of Hodgkin's disease

RUSHION Harry Captain VC USAR of Flint Mich stationed at the 168th Medical Detachment Berlin Germany graduated in 1941 from Ontario Veterinary College University of Toronto Ontario Canada commissioned a Captain in the Army of the United States and ordered to active duty 2 January 1951 died 2 August 1957 age 40 in Germany of acute cardiac failure with pulmonary edema

SCHNEIDER Patricia Marguerite Captain ANC USA of Ocala Fla stationed at the 10th Field Hospital Germany graduated in 1948 from the School of Nursing Charity Hospital of Louisiana New Orleans La. commissioned Second Lieutenant in the U S Army Reserve 14 October 1948 ordered to active duty 8 November 1948 commissioned Second Lieutenant in the United States Army 30 November 1950 died 15 August 1957 age 31 at the U S Army Hospital Wurzburg Germany of cardiac arrest

WRIGHT Janice Rex First Lieutenant USAFR (NC) of Pocahontas Va stationed at the U S Air Force Hospital Chateauroux Air Base France St Mary's Hospital School of Nursing Huntington W Va commissioned a Second Lieutenant in the U S Air Force Reserve 23 March 1951 ordered to active duty 15 November 1953 died 24 August 1957 age 27 in Chateauroux of asphyxiation

# OFFICERS CERTIFIED BY SPECIALTY BOARDS

## Supplementary Listing

According to information from the Offices of the Surgeons General of the military medical services, the following regular Medical Corps officers have been certified by the boards indicated since the listings published in previous issues of this Journal

### American Board of Ophthalmology

Robert W. Heidinger Capt USA

Robert H. Palmer Lt Comdr USN

### American Board of Surgery

Ralph R. Chapman Lt Col USA

### American Board of Physical Medicine and Rehabilitation

#### Physical Medicine

William M. Gilmore Jr Capt USA

Frederick J. Sheffield Capt USA

Richard S. Munger Maj USA

### American Board of Preventive Medicine

#### Public Health

Alfred G. Siegel Lt Col USA

### Aviation Medicine

Robert H. Adams Maj USAF

Rufus R. Hessler Jr Lt Col USAF

Charles A. Berry Maj USAF

William C. Maret Lt Col USAF

William G. Bradley Lt Col USAF

Robert F. Shirley Maj USAF

Richard S. Fixott Col USAF

Raymond A. Yerg Lt Col USAF

Harold E. Gillespie Capt USN

---

ERRATUM It is regretted that in printing the article by Dr. Charles G. Wilber on "Water Requirements of Man" that was published in the August 1957 issue of this Journal an error was introduced in the next to last line on page 1124. The word "Barometric" should have read "Vapor"—Editor

## CORRESPONDENCE

Honorable Frank B. Berry, M. D.  
Assistant Secretary of Defense  
Washington, D. C.

Dear Dr. Berry:

During these times of economy drives in Government, I would like to take this opportunity to bring to your attention the splendid work that is being done at the Armed Forces Institute of Pathology not only for the military but also for the civilian population.

The Armed Forces through its staff pathologists have given consultation services to the pathologists in all communities. They have also served as a clearing house for information of particular value to certain geographical locations. Their publications that are available are outstanding and are available at a nominal fee. The refresher courses offered at the Institute to military and civilian pathologists are a credit to the Armed Forces.

Through the guidance of extremely capable men who have headed the Institute particularly since the postwar years and now under the competent direction of Captain William M. Siliphant, MC, USN, the organization has reached the point of international recognition. On the domestic scene, it has provided material for seminars for medical societies such as the American College of Pathologists and many others.

Although a Government agency, the Institute is in no way in conflict with civilian institutions. It is unfortunate indeed that the work of the Institute is not brought to the public as a fine example of how money is being spent by the military to promote health and the welfare of the country.

I would therefore like to take this opportunity to express through your office my sincerest appreciation to the Director of the Armed Forces Institute of Pathology for making available the full consultation services of the staff pathologists to this community.

MARVIN N. SOLOVY, M. D., F. A. C. P.  
Pathologist, Newcomb Hospital  
66 South State Street  
Vineland, N. J.

## Reviews of Recent Books

**STRESS AND STRAIN IN BONES** Their Relation to Fracture and Osteogenesis by *I. CAYOR LINTS* Ph D American Lecture Series, Publication No 204 The Bannerstone Division of American Lectures in Medical Physics, edited by *Otto Glasser* Ph D 245 pages illustrated Charles C Thomas Publisher Springfield Ill, 1957 Price \$6.50

This book is a detailed report of the more significant experimental investigations on stress and strain in bones. The author has carefully reviewed the literature on this subject and has critically weighed the conclusions drawn by many investigators, including himself. The 15 chapters are devoted to the engineering principles involved and the results obtained in many investigations to determine the tensile, compressive, shearing, torsion, bending, and fatigue strength of bones of man and other animals. Conclusions and opinions concerning the significance of the results of these studies are presented briefly. A glossary of engineering terms is included and will assist the clinician in his effort to glean a significant fact to help him in the practice of orthopaedics. The list of references is comprehensive.

The average reader may be startled to learn that one investigator elected to study bone "of an ox six years of age, a mule, and the femurs of two women 42 and 90 years of age," and he may not be able immediately to grasp the importance of studying the comparative breaking strength of the bones of Polish cows and Dutch cows, but he will certainly be rewarded by learning many important facts to add to the little understood role of stress and strain in fracture productions as well as healing. The investigator will find much to interest him in this timely review and he should find it to be an indispensable reference. —CLIFFORD A. STEVENSON Capt MC USN

**CLINICAL CARDIOPULMONARY PHYSIOLOGY**, Sponsored by the American College of Chest Physicians, edited by *Burgess L. Gordon* M D et al 768 pages 248 illustrations 32 tables Grune & Stratton, Inc New York, N Y, 1957 Price \$15.75

Under the sponsorship of the American College of Chest Physicians, an editorial board headed by *Burgess L. Gordon* M D, and consisting of *Albert H. Andrews, Jr*, M D, *Alvan L. Barach*, M D, *John F. Briggs*, M D, *Edwin R. Levine*, M D, *George R. Meneely*, M D, *Hurley L. Morley*, M D, *Maurice S. Segal*, M D, and *Harold G. Trimble*, M D, has effectively assembled 39 subjects dealing with cardiac and pulmonary physiology, largely as they relate to clinical medicine today. The 52 contributing authors are recognized authorities in their field.

Here in a single volume is a summarization of clinical and physiologic data pertinent to cardiac and pulmonary problems that is so comprehensive it at once seems a little overwhelming. Although the primary purpose of this volume is to provide an understanding of altered physiologic mechanisms it would be unjust to fail to mention that much space is advantageously given to clinical descriptions, diagnostic studies and therapeutic measures particularly in so far as they alter disease states.

Almost of necessity there must be some overlapping of subject matter in the various sections and, as would be expected, this has created repetition of some basic and applied data. While adding to the bulk of the work this very repetition has immeasurably enhanced its value as a reference source inasmuch as each contributing author's section stands alone. This, of course, obviates the need for skipping from one section to another in search of basic or explanatory data. There has long been a great need for a collection such as this for it is without precedent and there is no comparable volume of its scope available today.—FRANK L. MILLER Lt Col. MC USA

**OBESITY Its Cause Classification and Cure** by E. Philip Gelvin, M.D., F.A.C.P. and Thomas H. McGavack, M.D., F.A.C.P. 146 pages. Paul B. Hoeber Inc. Medical Book Department of Harper & Brothers, New York, N.Y. 1957. Price \$3.50.

This volume represents a 10-year experience in an outpatient clinic devoted solely to the management of obesity. Chapters are devoted to pertinent basic biochemistry and consideration of endocrine and metabolic factors but the best section is undoubtedly the one dealing with diet. The authors emphasize correctly the necessity for constructing a weight reducing diet that will establish proper eating habits after termination of treatment and discuss the deficiencies in the use of the high protein diet and the Pennington high fat diet with this in mind. In attempts to arrive at a standardized reducing diet such factors as expense, availability, popularity and variability have been carefully considered. Emphasis is placed on the size of portions rather than adherence to calories per se.

Three chapters are devoted to the use of various drugs in the treatment of obesity. The enthusiasm in this text for amphetamine derivatives is not shared by many other workers in the field but appears justified on the basis of a fairly extensive objective clinical study which is well documented. Other subjects such as the use of cortisone or prednisone in the therapy of special forms of obesity should be viewed with a high degree of skepticism and are not well substantiated by figures or case material although reference is made to some thirty patients.

The bibliography covers 131 references to various aspects of the subject and serves as an excellent springboard for more detailed study. There were however no references to psychologic factors in the genesis of obesity although an impressive literature has accrued on this

subject. Only one page is devoted to this subject in the text and clearly, little is said about the psychological factors that play an important role in the patient's ability to proceed with treatment effectively. This is perhaps a reflection of the nature of our patient practice.

This book is aimed at the general practitioner or internist and the authors are to be commended for its simplicity, directness, and emphasis on the practical aspects of therapy. If it does nothing else but illustrate our extraordinary lack of knowledge about this important subject, it will have served its purpose. —ALL J. KOSEFF Capt. MC USA

**TEXTBOOK OF PATHOLOGY With Clinical Applications** by Stanley L. Robbins, M.D. 1351 pages illustrated W. B. Saunders Co. Philadelphia, Pa. 1957. Price \$18.

In the preparation of this textbook of pathology, Dr. Robbins set out to produce a volume particularly for students and clinicians. He has not only accomplished this but also written a book which will be useful to pathologists. The subject matter is handled in logical sequence beginning with the normal, going through etiology, pathogenesis, pathologic alterations, and ending with clinical correlations. General pathology and principles are presented in the early chapters to be followed by organ and systemic pathology. The subject matter of pathology is covered quite fully with major emphasis placed on the commoner lesions. Uncommon disorders might occasionally be given greater prominence but of course there is a limit to the size a text may assume. Some chapters have been prepared by specialists in particular fields.

The book is well bound and printed accurately in clear, legible type on good quality paper. Numerous illustrations of superb quality are employed throughout the text. References at the end of some chapters might well be expanded in number but those given have been well chosen. The index, a most important part of any text, is extensive and permits ready location of desired material.

One of the most outstanding accomplishments of this book is its easy readability and ready comprehension. Dogmatism is avoided throughout, controversial and unsettled problems are discussed fully, and various opinions presented with attempts to reconcile the differing views wherever possible. Clinical correlations and applications are particularly useful. This book is to be recommended highly for medical students and clinicians, and the practicing pathologist will also find it a source of much valuable information. —HOWARD A. VAN AUKEN Col. MC USA

**PRACTITIONERS' CONFERENCES** Held at The New York Hospital-Cornell Medical Center. Volume 6. Edited by Claude E. Forkner, M.D., F.A.C.P. 378 pages illustrated. Appleton-Century-Crofts, Inc., New York, N.Y. 1957. Price \$6.75.

This is the sixth in a series of conferences held at the New York Hospital-Cornell Medical Center and presents a variety of entities in panel form. There are 15 chapters dealing with such

sified subjects as "Should Parents be Told the Truth About Serious Illness" to discussions on cancer of the thyroid prostate esophagus lung and bone. Panel discussions are also presented on heart disease dermatology endometriosis encephalitis and parkinsonism gout trichinosis and portal hypertension. A chapter on Consultations with Anesthesiologists provides excellent coverage of current thoughts on the types of anesthetic agents employed their effects on the body and their dangers.

The presentations are spirited and are aimed at the practical side of the practice of medicine. In several chapters the discussants refer to slides they are showing but in such a fashion that it is of little or no benefit except for those physically present. A few words of edited summary would save space and readers' time at these points. All the pertinent facts elicited in the discussions are aptly and systematically summarized at the conclusion of each chapter. In addition a small but well chosen bibliography on the subject is also listed. This series of conferences would be a welcome addition to a general practitioner's library and to hospital and medical school libraries. It is too diversified for the specialist. —JULES J McNERNEY Lt Col MC USA

**HANDBOOK OF LEGAL MEDICINE** by Louis J Regan M D LL B and Alan R Moritz M D. 201 pages illustrated. The C. V. Mosby Co. St. Louis Mo. 1956. Price \$3.90.

The first 95 pages of this book concern relationships between the physician the patient and the law. The balance of the volume deals with scientific medicolegal investigations. In addition, there is a glossary of 12 pages, a list of references for more detailed information, and a well compiled index.

This small compact volume covering the more important highlights of medicolegal ramifications is well written in clear and distinct form with good illustrations. It should be read by all physicians and dentists as well as students in both professions. The book would be excellent reading as well for nurses particularly nurse supervisors and hospital administrators. It has a wealth of knowledge condensed into readily readable size. —FRANK P GILMORE Rear Adm. MC USN

**THE FAMILY IN PSYCHOTHERAPY** by C. F. Midelfort, M D. 203 pages. The Blakiston Division McGraw-Hill Book Co. Inc. New York N Y. 1957. Price \$6.50.

In this compact volume the author describes his experiences with psychiatric patients admitted to the La Crosse Lutheran General Hospital. In this institution relatives have long been allowed to stay with mental patients to assist in occupational recreational and insulin therapies. Dr. Midelfort reports on patient treatment in which relatives take part in therapeutic interviews.

The book is largely composed of case histories with special emphasis on schizophrenia depression paranoid illness psychopathic per-

personality and psychoneurosis. The reader will find innumerable the provoking clinical observations depressed patients are the victims of the restricting cultural traditions of families of uniform ethnic religious and family backgrounds. Also the psychiatrist cannot approach the paranoid patient directly but can do so through common activities with the patient's children. The thesis which Dr. Midelfort's case histories illustrate is that mental illness in the family is a product of genetics and of social and cultural heredity. The factors that play a dynamic part in mental illness are at work in the family and to treat only one patient from the family without the others can influence only a part of the difficulty leaving much untouched.

Dr. Midelfort's book is a significant contribution to the growing trend toward greater inclusion of the patient's family milieu in psychotherapy. In addition it is an excellent illustration of the advantages of psychiatric treatment within the setting of the general hospital. One cannot fail to be impressed with Dr. Midelfort's many successfully treated cases (although his failures are discussed very candidly) and with the modest expenditures of the therapist's time which were often involved. There is much in the area of practical handling of patients and families which has been omitted from the book: one patient's husband and small son remained in the hospital with her during her acute psychosis, a therapeutic maneuver which must have required a great deal of flexibility on the part of the staff.

Dr. Midelfort has made an important contribution to psychotherapy and his book is strongly recommended for all concerned with the treatment of mental illness.—JOHN C. WEBER, Lt. Col. USAF (MC)

Zinsser's BACTERIOLOGY by David T. Smith, M.D., Norman F. Conant, Ph.D., et al. 11th edition. 953 pages illustrated. Appleton-Century-Crofts, Inc., New York, N.Y., 1957. Price \$12.

This is a new edition of a time-honored publication that has always been a valuable asset to students, instructors, bacteriologists, epidemiologists, and laboratory staffs. The objective of the original authors, Hiss, Zinsser, and Bayne Jones, has again been presented to this edition, extending not only the biologic characteristics of the organisms but also the reactions of living tissues to bacteria and their metabolic products. In this manner the text becomes of equal value to the bacteriologist, the epidemiologist, the public health profession, and to the student. The philosophy of the presentation has been to substantiate the basic biologic approach to bacteriology, and at the same time to emphasize the public health significance and the practical clinical importance of certain of these biologic characteristics of organisms. Epidemiological characteristics also are included in each presentation, thus extending the value of this publication.

This edition has undergone extensive revisions and the interest of presenting as completely as possible the most recent information on each subject. W.



the advent of the tenth edition nearly twice as many significant publications in the field of microbiology have appeared as in the previous five years. Advancement in the field of bacterial physiology, immunology, and viruses have been incorporated in this text. A new chapter covering the academic aspects of blood grouping and immunohematology also has been added. This edition also includes information on the susceptibility effects of the newer antibiotics on specific organisms. Each chapter closes with an excellent list of references.

This text is an excellent consolidation of technical material derived from current investigations on each group of organisms. It is highly recommended for inclusion in the technical libraries of laboratories for basic science students and for individuals concerned with epidemiology or diagnostic laboratory facilities.

—WILLIAM H. LEE Lt Col USAF (MSC)

**THE DIAGNOSIS AND TREATMENT OF ENDOCRINE DISORDERS IN CHILDHOOD AND ADOLESCENCE** by Lawson Wilkins M D 2d edition 526 pages illustrated Charles C Thomas Publisher Springfield Ill 1957 Price \$17.50

This classical work in pediatric endocrinology has been extensively revised and expanded in this second edition. Written and presented for the clinician, the case reports, original pictures of clinical material, and easy readability greatly enhance the value of this book. Of particular interest in this revision are the newer diagnostic methods, the discussions of sex chromatin, metabolism of carbohydrates and calcium phosphorus. The chapter on the adrenogenital syndrome has been revised in the light of the therapeutic response to cortisone. The one on the hormone assays and tests and their diagnostic applications and limitations is exceedingly well presented. Differential diagnosis is stressed. There is an extensive bibliography at the end of each chapter which is subdivided according to the subjects with which they deal. This most authoritative and up-to-date presentation of endocrinology written by an author who has made notable contributions in this field should be in the library of those engaged or interested in the treatment of endocrine disorders in the pediatric age group.

—ERNEST R. MOELLER Capt MC USN

**THE NURSE AND THE OUTPATIENT DEPARTMENT** by Audrey Windemuth R N B S 580 pages The Macmillan Co New York N Y 1957 Price \$6.50

The author with her vast experience has a comprehensive knowledge and understanding of the subject of this new book which deals exclusively with the nurse and the outpatient department. Her style of writing makes for easy and enjoyable reading and arouses an interest to read further. The position of the outpatient department in functioning between the hospital and the community health activities is clearly and concisely outlined. While all outpatient department activities are covered briefly, particular emphasis is placed on teaching patients better health measures which will aid in promoting a healthier com-

units. The relationship of the doctors, dietitian, physical therapist, occupation therapists, social workers, and public health workers related to the total patient care is treated in a manner that clearly depicts each role.

Since the age of rapidly expanding medical care through outpatient service the nursing profession has been in need of an up-to-date textbook for teaching and training personnel. Miss Warden has very well filled this need most admirably. It is recommended as a reference for graduate nurses concerned with outpatient nursing and should be of particular value to all schools of nursing. It contains an excellent index with cross reference to facilitate its use.

—ALICE L. SOLT, MS, ANCC USA

**MAGNETIC REMOVAL OF FOREIGN BODIES** The Use of the Alnico Magnet in the Recovery of Foreign Bodies from the Air Passages, the Esophagus, Stomach and Duodenum, by *Murdock Equen, M.D., F.A.C.S.* 94 pages. Illustrated. Charles C. Thomas, Publisher, Springfield, Ill. 1957. Price \$4.50.

The author has drawn upon more than 12 years of experience with Alnico Magnets in removal of ferrous alloy (magnetic) foreign bodies from the tracheobronchial tree, esophagus, stomach, and duodenum. His monograph is written in an informal, conversational style and organized into seven short chapters. Much of the contents of the book is devoted to case histories depicting the various situations that confront the patient, parents, physician, and the specialist when foreign bodies become lodged in the air passages or the upper gastrointestinal tract. Photographs of the various modifications of the small semipermanent magnets utilized for removal of magnetic foreign bodies from various levels in the air passages and upper gastrointestinal tract are included together with an ample array of reproductions of roentgenograms demonstrating almost every conceivable foreign body problem.

Dr. Equen reports phenomenal success employing his technique with the magnet under fluoroscopic guidance in over two hundred cases, although an occasional unsuccessful case is reported. This reviewer does not fully share in the policies of the author as to the early removal of small foreign bodies from the stomach and duodenum which, by and large, are prone to continue their harmless passage on through the gastrointestinal tract within a few days. It is of interest that of 19 metallic foreign bodies retrieved from the duodenum, 10 had been swallowed on the day of removal. Notwithstanding Dr. Equen's keen advocacy of magnetic methods, he does include remarks on disadvantages, contraindications, and precautions that are felt to be quite logical.

This book is recommended to professional libraries that provide references for any sizable group of physicians; it can be read with interest by the general practitioners, general surgeons, otolaryngologists, bronchoscopists, gastroenterologists, pediatricians, and radiologists. —JOHN M. SALYER, Col., MC USA

**DEVELOPMENTAL ABNORMALITIES OF THE EYE** by Ida Mann C. B. E.  
M. A. (Oxon) D. Sc. M. B. B. S. (Lond) F. R. C. S. (Eng) F. R. A.  
C. S. 2d edition 419 pages illustrated J. B. Lippincott Co Phila-  
delphia Pa. 1957 Price \$15

This second edition of what has become a classic in ophthalmology deserves the praise which it will continue to receive. A subject not appealing to many clinicians is tied in so closely with problems of practice that the book is fascinating to read. It progresses logically from the discussion of the development of the eye from conception through its intrauterine phase and then through life. Finally it considers those senile changes which are based on an hereditary background.

The discussion in sequence of events pertaining to individual structures is especially valuable for reference purposes. The anatomy is reviewed in detail in the process and the differentiating points between developmental and disease processes are emphasized. This results in necessary duplication of material but makes reference much easier and conditions more readily understood. The illustrations are excellent and abundant.

This book will be especially valuable to the ophthalmologist since it was written by an ophthalmologist with that goal constantly in mind. It is highly recommended for inclusion in the libraries of ophthalmologists, geneticists, pediatricians, psychiatrists, neurologists and others interested in abnormalities of the eye.

—VICTORIA BYRNES Brig Gen. USAF (MC)

**A MANUAL OF PHARMACOLOGY and Its Applications to Therapeutics and Toxicology** by Torald Sollmann M. D. 8th edition 1535 pages W. B. Saunders Co Philadelphia Pa. 1957 Price \$20

Earlier editions of this manual have been in common use longer than almost any other textbook in the medical sciences except of course Gray's Anatomy yet this volume is by the same author who in 1917 wrote the first edition which has since been an important guide to the medical student and especially to the pharmacologist.

As an aid to the student the sections in ordinary type in this edition as in earlier ones present "the material all students should aim to know" while the sections in small type contain important reference information. The bibliography of approximately 4000 references is restricted to those publications since 1939. Earlier references are in other editions. Recognizing the difficulties of classifying drugs entirely by chemical nature or by physiologic action the author has used both such as "sulfonamide compounds" and "convulsant poisons." Most frequent use is made of a chemical classification. There is no division into chapters.

The professional pharmacologist will continue to find the book very useful because of its wide scope and useful references. The medical

student and those in related fields may find the failure to follow more common arrangements and the lack of chemical information disadvantageous. The space devoted to individual drugs bears little relation to their frequency of use. As instances, several times as much space is devoted to oil of turpentine as to meprobamate (consistently referred to as meproamate) which is discussed with 16 lines of small type, the discussion of strychnine occupies eight pages and that of setorinin less than one half, approximately the same amount of space is devoted to the use of bismuth in syphilis as to the use of penicillin in this disease.—PAULA SMITH Col USAF

CIBA FOUNDATION SYMPOSIUM on the CHEMISTRY AND BIOLOGY OF PURINES. Editors for the Ciba Foundation G. E. W. Wolstenholme O B E M A M D B Ch. and Cecilia V O'Connor B Sc 327 pages with 124 illustrations and structural formulae Little, Brown & Co Boston Mass 1957 Price \$9

In its treatment of the synthesis and biological activity of purines, this volume attains the high level of achievement which has characterized the recorded proceedings of previous Ciba Foundation Symposia. It can be expected to receive the careful attention of organic chemists concerned with the structure and synthesis of purines and of purine derivatives of known or potential biological significance. The collected papers also contain much that will be of similar importance to persons interested in fundamental research on cancer, enzymes and the development of new chemotherapeutic agents.

Material pertaining to synthetic organic chemistry is concentrated upon the preparation of purines and of related compounds intended for testing as chemotherapeutic agents (e.g. in acute leukemia) compounds which might be expected to occur in the course of the *in vivo* oxidation of purines, and those which might provide an improved understanding of nucleoside structure (e.g. putomycin). Analogous subject matter is concerned with determinations of hydroxy purine structure, the chemistry of new purines of the B<sub>12</sub> vitamin series and the chemical transformation of purines into pteridines.

On the biochemical side there is an extended review of the recently enhanced state of our knowledge concerning purine biosynthesis, a discussion of the available evidence relative to the hypothesis that xanthine oxidase is a "key enzyme" in controlling the pool of biological purines and a consideration of the relationship between biological activity and alterations in the molecular structure of puromycin. Finally there is a paper on the biochemistry of 6-mercaptopurine followed by a discussion of the clinical limitations of 6-mercaptopurine therapy, based upon the study of 18 patients with acute leukemia and of 12 patients in the terminal stages of chronic myeloid leukemia. Only 7 of the former were treated with 6-mercaptopurine alone 3 of these died without achieving remission. Seven of the 12 chronic myeloid leukemia patients received no benefit from treatment with 6-mercaptopurine.—THADDEUS J DOMANSKI Col USAF (MSC)

The Early Diagnosis and Treatment of ACOUSTIC NERVE TUMORS by J Laurence Pool M D and Arthur A Pava M D American Lecture Series Publication No 303 A Monograph in American Lectures in Surgery edited by Michael E DeBakey M D, and R Glen Spurling M D Neurosurgery Division, edited by Barnes Woodhall M D 161 pages illustrated Charles C Thomas, Publisher Springfield Ill 1957 Price \$5.50

This is a thorough well written study of a relatively infrequent type of brain tumor of primary interest to neurosurgeons. It is also of diagnostic interest to general practitioners neurologists radiologists otolaryngologists and internists because it is this group of physicians who most frequently have the opportunity of making the all important early diagnosis.

The chapters relative to the differential diagnosis signs symptoms and diagnostic procedures currently employed are especially to be commended because of their completeness. In compiling the frequency of the various signs and symptoms the authors not only utilize their own series of 122 patients but also those of five other large series. The other important chapters are devoted to operative intervention with presentation of data on total versus subtotal removal operative technique and postoperative management. Mortality complications and sequelae from operative intervention are enumerated and analyzed with due emphasis on facial nerve paralysis and its subsequent treatment.

—WILLIAM J JAMES Capt MC USA

BASIC NUTRITION by E W McHenry M A Ph D F R S (C) 389 pages J B Lippincott Co Philadelphia Pa 1957 Price \$5

Practicability is the keynote of this book. Historical data sources and requirements of the various nutrients are presented in a clear concise and factual manner. Emphasis throughout is on the need to consider the nutritional requirements of the individual. Arbitrary adherence to a prescribed dietary standard without giving thought to the factors affecting the requirements is discouraged. Flexibility in the selection of food to achieve adequate nutrition is recommended rather than advocating a rigid set of rules to follow. While it is shown that the nutritional requirements might be met by the use of a very simple selection of food this is not advised from a practical point of view.

Special diets receive only brief notice both as to types of diets discussed and as to space devoted to this subject. Here too caution is advised. The student might well heed the advice that there is benefit to be gained by both the hospital and the patient from limiting special diets to those that are really necessary. Attention is directed to the pitfalls of indiscriminate use of restricted diets. Dietary standards principally those of the United States and Canada are explained and omissions from these standards are pointed out. The evaluation of nutritional studies gives an insight into the value of these studies. From this introduction to the study of nutrition the student should be well aware of the many facets of nutritional education.

—HELEN M DAVIS Lt Col AMSC USA

**PEDIATRIC CLINICS OF NORTH AMERICA** Symposium on Pediatric Hematology, May 1957. *Wolff H. Zuelzer* M.D., Consulting Editor. 591 pages. Illustrated. W. B. Saunders Co. Philadelphia Pa. 1957. Price \$15 per year of 4 books issued quarterly. Sold only by a year of four consecutive numbers.

Previous publications of these clinics have been excellent and this volume is no exception. The consulting editor states in the foreword that no attempt was made to cover the entire subject. Nevertheless most of the important aspects of pediatric hematology are covered expertly and concisely. The volume is obviously directed to those who have direct responsibility for the care of the child. The selected bibliography should make this a frequently consulted work. Deserving of special attention are the rational approach to the diagnoses of the pediatric anemias. Dr. Chown's refreshing style applied to the nonhemolytic anemias and the language of genetics provided by Dr. Neal. The logical and practical approach made by Dr. Wheeler to exchange transfusion in erythroblastosis is alone worth the price of the book.—*LEO J. GIPPERT* Col. A.C. USA

**THE SPECIALTIES IN GENERAL PRACTICE** edited by *Russell L. Cecil* M.D. and *Howard F. Conn*, M.D. 2d edition. 780 pages. Illustrated. W. B. Saunders Co. Philadelphia Pa., 1957. Price \$16.

The second edition of this book first published in 1951, consists of 14 chapters each dealing with a different specialty field and written by a senior specialist in that field. Its purpose, to quote the editor, is to provide "a sort of ready handbook for the busy physician in which he might find brief and practical descriptions of how to handle the less serious problems in the various special fields." The fields of internal medicine and general surgery are not included, presumably on the basis that general practitioners are already familiar with the commoner conditions in these fields. The emphasis in the book is not on recent advances in the fields but rather on abbreviated textbooks dealing with the common conditions in each field.

Some of the faults in this book are inherent in the basic editorial design. The degree of compression of material required by the size and scope has frequently resulted in a stripped skeleton of no value to anyone such as the 30 lines on gout or the single page on Port's disease in the section on orthopedic surgery. This brevity approaches the danger point in many areas where essential information is omitted. In the section on pediatrics, neomycin is advocated for infant diarrhea with no warning of its toxicity and no suggestion for a stool culture prior to instituting therapy. Other faults are even less easy to explain or condone. In the discussion of dog bite and rabies prophylaxis in the section on pediatric immunization, there is no mention of the existence of rabies antiserum although this is an essential part of modern management. In the section on nose and throat there is no mention of ear infections as an indication for tonsillectomy but tonsillectomy is recommended to eradicate foci of infection. Other faults are found even in the absence of any other.

section septic sore throat is vaguely considered as being due to a variety of secondary invaders following a viral infection. The statement is made that beta hemolytic streptococci are implicated in only 25 per cent of the cases. In treatment sulfa drugs are considered of equal value with penicillin and doubt is expressed as to whether every infection should be treated with antibiotics at all. Neither rheumatic fever nor the suppurative complications of streptococcal diseases are mentioned.

This book is not recommended. The sections which are accurate and up to date are too brief to be of any real value and others contain misinformation — CHRISTIAN GROVBECK, Jr. Lt Col MC USA

SCOVILLE S. THE ART OF COMPOUNDING by Glenn L. Jenkins, Don E. Francke, Edward A. Brecht and Glen J. Sperandio. 9th edition. 551 pages illustrated. The Blakiston Division, McGraw-Hill Book Co., Inc. New York, N. Y. 1957. Price \$11.

This new edition of a standard work is greatly improved in several respects. Like former editions it concentrates on the study of compounding and dispensing and eliminates related but extraneous subjects such as manufacturing processes and administration of drugs. Every part has been revised and brought up to date. Several of the chapters have been completely rewritten and the work has been made more suitable for use as a textbook.

The authors have arranged the material so that the student progresses systematically from the simpler to the more complex problems of compounding and dispensing. They have kept in view two main objectives: first, to present the principles underlying each practice so that the student may understand the theories as well as perform the operations involved in compounding; and second, to illustrate the principles by prescriptions and exercises and to show their practical utility at the prescription counter. They have kept the volume to a convenient size by the omission of illustrations or subject matter that have become obsolete or belong properly in other courses and have added to its practical value by using illustrative examples drawn from actual practice. The section on incompatibilities is especially improved by the inclusion of many new items and is arranged so that it may be used by itself as a one term course.

The new chapter on ophthalmic solutions and the enlarged chapters on powders, capsules and effervescent salts, tablets, parenteral solutions, isotonic solutions, sterilization and infection and ointment and ointment type preparations are a few examples of the improvements and modernization to be found in the treatment of every subject. The authors deserve the thanks of both students and practicing pharmacists for the thought and labor they have expended in making this new edition so valuable as a textbook and work of reference.

—RUSSELL L. TAYLOR, Capt. MSC USN

FUNDAMENTAL OF CLINICAL PHYSIOLOGY by Paul S. Grollman, M.D., F.A.C.P., formerly illustrated, Charles C. Thomas, Publisher Springfield, Ill. 1956. Pp. 312.

This review of the fundamentals of neurophysiology is an excellent illustration of material the author has presented in the first year course in physiology at Harvard Medical School.

The basic mechanisms responsible for the special functions of the nervous system are discussed. The early chapters cover the membrane potential and the nerve impulse, electrical excitation of nerve, and action potentials in simple fibers and mixed nerves. After a discussion of the general physiology of receptor organs, the author discusses the various senses. A brief review of muscle physiology is included. Reflex activity in the nervous system is described at the various levels of organization. Cerebellar and cerebral cortical function is presented in considerable detail, as well as the interrelationships between various brain centers.

The bibliography is extensive and the reader may at times get lost in the barrage of names and dates that document nearly every paragraph. However, patience with these details will reward the student with a good orientation to "the better established facts of neurophysiology" as the author writes. This book will be of interest to medical students and persons entering the clinical fields of neurology and psychiatry.—ROBERT L. WILLIAMS, *M.D. (Harv.)*

CLINICAL PROCTOLOGY by J. Leeman, *Associate Professor, M.D., M.C., (Med.) M.D., F.A.C.S.*, 216 Wilson Ave., New York 10014. W. B. Saunders Co. Philadelphia, Pa. 1957. Pp. 312.

This is a practical, concise, and orderly presentation of proctologic precepts beginning with a discussion of pertinent anatomy and physiology, proceeding through diagnostic procedures, and describing the common anorectal diseases. Pre and postoperative care is thoroughly discussed, and congenital malformation, neoplastic disease, and anal pruritus are considered. The final chapter gives a brief discussion of miscellaneous subjects such as bowel management, enemas, laxatives, suppositories, fecal impaction and incontinence, and various diseases. The chapter on clinical proctoscopy is particularly good and includes black and white and color photographs made through the proctoscope.

Unlike much current scientific literature this book is written in an easy straightforward style which approaches personal teaching by the author himself. The illustrations and photographs are the perfect complement to the text material. The medical student will find this book complete and readily understandable. The house physician or practicing physician who reads it will find himself more confident (and of greater service) in his approach to proctologic problems. It is highly recommended for anyone who does or contemplates doing proctoscopic examinations or any type of proctologic treatment.

—JAMES H. STUART



**SOCIOLOGY Its Use in Nursing Service** by Gladys Sewell B S, R N  
Ph O and Paul Hanly Furfey Ph D LL O 4th edition 502 pages  
illustrated W B Saunders Co Philadelphia Pa 1957 Price \$5

This revised edition follows the general concepts of sociology and its application in nursing practice The first part is a general outline of a beginning course in first year college sociology followed by a discussion of the relation of health to social conditions The final part deals with the social conditions and problems the nurse may meet in the care of patients in hospitals clinics and in public health work The last three chapters deal with illnesses in the various age groups and the sociopsychologic factors to be considered in each

The text is written in terms which can be understood by the beginner in both sociology and nursing At the end of each chapter topics for discussion and selected references are listed The chapter on human groups should be particularly helpful to the beginner in developing an awareness of groups and subgroups within the social structure of a society and the social processes which make for unity or disunity in that society The authors have achieved their purpose in providing a helpful text for nursing students and the book should be well received

—CHARLOTTE R. RODEMAN Maj ANC USA

**ENCYCLOPEDIA GUIDE TO NURSING** by Helen F Hansen R N M A  
406 pages illustrated with 8 colored plates The Blakiston Division  
McGraw-Hill Book Co Inc New York N Y 1957 Price \$6

This volume of standard nursing textbook size is the result of an endeavor to fulfill the need for a reference book of definitions guiding principles brief summaries of subjects and explanations of techniques and procedures To make it of practical value to nurses scientific detail and terminology have been reduced The terms listed are those in current use in the medical field and afford the reader clear explanations of up-to-date medical techniques and nursing procedures Full discussion of topics is one of the strong points of the book Detailed nursing procedures are given in conjunction with definitions where applicable The illustrations are limited to a set of excellent colored plates of the skeletal muscular arterial and venous systems and of the viscera

The pronunciation guide is not complete Reference must be made to a standard dictionary The appendices include a list of commonly used abbreviations prefixes and suffixes and tables of elements equivalent centigrade and Fahrenheit temperatures and weights and measures The completeness of the definitions of the terms listed and the cross references indicated show the author's respect for detail This volume is intended as a reference book for nursing service

In comparison of Hansen's "Encyclopedia Guide to Nursing" and Taber's Cyclopedic Medical Dictionary the former would be a fine supplement to but not a replacement for the Taber volume If one volume is to be chosen for use by all levels in the medical field Taber's Cyclopedic Medical Dictionary would be of most value

—EMMA F HOUSTON Lt Col ANC USA

**DYNAMICS OF PSYCHOTHERAPY**, the Psychology of Personality Change  
Volume II by *Perceval M. Symonds* Ph.D. 440 pages Cune & Stratton  
Inc. New York, N. Y., 1957 Price \$6.95

This is the second book of a three volume series devoted to the principles and practice of psychotherapy. Whereas the first volume was concerned with basic viewpoints and with the nature of psychoneurosis, the present work deals elaboratively with the client-therapist relationship as it develops through the processes of transference, resistance, attraction, insight and identification. The third book will be concerned with various practical therapeutic procedures. All three volumes are intended both as texts for students of psychotherapy and as reference works for established practitioners.

Although the author's theoretical orientation is clearly visible throughout the exposition, little attention is paid to abstruse and speculative concepts as such. On the contrary, the principal merit of the book seems to this reviewer to be in the rich and detailed description, analysis, and interpretation of the client's therapeutic experience at the behavioral level. What actions and attitudes to expect, how to recognize them, what their motivations are, and what their significance is for the therapeutic process as a whole are skillfully discussed.

From all points of view this book is exceptionally readable. It is well organized and its literary quality is superior. An annotated bibliography of some 240 titles enhances its value as a reference. It would be a valuable addition to the libraries of physicians, psychiatrists, clinical psychologists, and others concerned professionally with counseling and guidance.

—ROBERT B. PAYNE Lt Col USAF (MSC)

**LAW EVERY NURSE SHOULD KNOW** by *Helen Creighton* B.S.N., R.N., A.B., A.M., J.D. 197 pages W. B. Saunders Co. Philadelphia, Pa. 1957 Price \$3.50

In this paper bound "handbook" the author has presented in a clear, concise, and nontechnical manner the various phases of law which every nurse should know or be familiar with. A valuable and most informative book, it is one of the few written for nurses on this subject as it pertains to the practice of their profession. A brief presentation of the structure of our government, the sources of law, and function of the courts is followed by the purpose and problems of licensure for both the practical nurse and the professional nurse. Contracts, including breach and termination of contracts, are discussed in order that the nurse will know her rights, duties, and liabilities regarding them.

The legal status of the nurse and her rights and liabilities in relation to her position and status are also discussed. In the chapter on negligence and malpractice, the author discusses and briefly the common acts of negligence and malpractice.

nurse's liability in regard to them. Torts and criminal acts from misdeemeanors to felonies which the nurse is likely to encounter are presented as well as her responsibility as a witness in legal procedures and the making of wills. The last chapter is devoted to the legal aspects of nursing in Canada. There is an excellent table of contents and a good index. Also following each chapter is a list of case references as well as general reference readings.

This book is one which every nurse should have in her possession as a ready reference regarding her legal rights, duties and liabilities.

—AILEEN E. BRUMMER, Maj, USAF (NC)

**ORAL DIAGNOSIS AND TREATMENT (Oral Medicine)** A Textbook for Students and Practitioners of Dentistry and Medicine by Samuel Charles Miller D.D.S., F.A.C.D., F.A.D.M. and 37 contributors with an introduction by Raymond J. Nagle D.M.D., F.A.C.D. 3d edition. 977 pages. 577 illustrations in black and white and 30 color plates. The Blakiston Division, McGraw-Hill Book Co., Inc. New York, N.Y. 1957. Price \$16.

An old light burns with new luster as Dr. Samuel Charles Miller's "Oral Diagnosis and Treatment" keeps pace with 10 years' advance of dental science. The new third edition, as were the two previous editions, will be a valuable aid to the accurate practice of dentistry. Dr. Miller has edited the work of 37 experts into an authoritative 30-chapter volume which is a specific guide to the scientific approach to oral diagnosis. The presentation is masterful and concise.

Although the title of this book includes the term "treatment," this aspect, as might be expected, runs second to the clean-cut work in diagnosis. Treatment is discussed more on a suggestive basis of an outline type. With the references included, it can be a satisfying guide to treatment. It would not be fair to expect to cover the field in both diagnosis and treatment in a single volume of less than one thousand pages. There is one amazing new chapter on "Identification Keys as Diagnostic Aids." This is "an organized plan of analysis" using as keys the parts affected coupled with the signs and symptoms. It is a clever and well-planned procedure. Making the key to unlock the "unfamiliar condition" is a fascinating process.

Dr. Miller's standard text has become a part of almost every dental practice. The added coverage of this new edition should make it even more useful to the profession. The chapter on aviation dentistry alone will endear this volume to many practitioners. Nine of the chapters are entirely new. More than ever, this book is the cornerstone for every dental library. —JULES D. KARTMAN, Lt. Col. USAF (DC)

## New Books Received

Books received by the *U. S. Armed Forces Medical Journal* are acknowledged in this department. Those of greatest interest will be reviewed in a later issue.

- HORMONAL REGULATION OF FETAL METABOLISM** compiled and edited by *Lawrence R. Ainsell M.D.* 242 pages Charles C Thomas Publisher, Springfield Ill. 1957 Price \$5.25
- TEN MILLION AND ONE Neurological Disability as a National Problem** Arden House Conference. Sponsored by *The National Health Council*. 102 pages Paul B. Hoeber Inc. Medical Book Department of Harper & Brothers New York N.Y. 1957 Price \$3.50
- CLINICAL GASTROENTEROLOGY** by *Eddy D. Palmer M.D. F.A.C.P.* Illustrations by *Phyllis Anderson*. 630 pages illustrated Paul B. Hoeber Inc. Medical Book Department of Harper & Brothers New York N.Y. 1957 Price \$18.50
- Craig and Faust's CLINICAL PARASITOLOGY** by *Ernest Carroll Faust A.B. M.A. Ph.D.* and *Paul Farr Russell M.D. M.P.H.* with the Editorial Assistance of *David Richard Lincicome B.S. M.S. Ph.D.* 6th edition 1078 pages 346 illustrations 7 plates in color 23 tables Lea & Febiger Philadelphia Pa. 1957 Price \$15
- DE MOTU CORDIS (Movement of the HEART AND BLOOD in Animals). An Anatomical Essay** by *William Harvey* Translated from the original Latin by *Kenneth J. Franklin* and now published for the Royal College of Physicians of London 209 pages illustrated Charles C Thomas, Publisher Springfield Ill., 1957 Price \$3.50
- LENS MATERIALS IN THE PREVENTION OF EYE INJURIES** by *Arthur Hail Keeney M.D. Sc.* American Lecture Series Publication No. 307 A Monograph in American Lectures in Ophthalmology edited by *Donald J. Lyle M.D. F.A.C.S.* 73 pages illustrated Charles C Thomas Publisher Springfield Ill. 1957 Price \$3.50
- MEDICAL RADIATION BIOLOGY** by *Friedrich Ellinger M.D.* 945 pages illustrated Charles C Thomas, Publisher, Springfield Ill. 1957 Price \$20
- METHODS OF GROUP PSYCHOTHERAPY**, by *Raymond J. Corsini Ph.D.* 251 pages illustrated The Blakiston Division McGraw-Hill Book Co., Inc. New York N.Y. 1957 Price \$6.50
- MODERN PERINATAL CARE** by *Leslie V. Dill M.D. F.A.C.S.* 309 pages illustrated Appleton Century Crofts Inc. New York N.Y. 1957 Price \$6.50
- PSYCHOPATHIC PERSONALITIES** by *Harold Palmer M.D.* 179 pages Philosophical Library, Inc. New York, N.Y., 1957 Price \$4.75
- BIOCHEMISTRY** by *Abraham Cantarow M.D.* and *Bernard Schepartz Ph.D.* 2d edition 867 pages illustrated W. B. Saunders Co. Philadelphia Pa., 1957

THE YEAR BOOK OF CANCER (1956-57 Year Book Series). Compiled and  
 edited by Randolph Lee Clark Jr B S M D M Sc (Surgery) D  
 Sc (Hon) and Russell W Cumley B A M A Ph O 372 pages  
 illustrated The Year Book Publishers Inc Chicago Ill 1957 Price  
 \$7 50

THE HUMAN BRAIN From Primitive to Modern by A M Lassek M D Ph  
 O 242 pages Charles C Thomas Publisher Springfield Ill 1957  
 Price \$4 75

CHEMISTRY OF ORGANIC COMPOUNDS by Carl R Noller 3d edition 9 8  
 pages illustrated W B Saunders Co Philadelphia Pa 1957

HANDBOOK OF TOXICOLOGY edited by William S Spector compiled from the  
 Literature by John A Porter and Gilbert C De Vella Volume 2 Anti  
 biotics Prepared under the Direction of the Committee on the Hand  
 book of Biological Data Division of Biology and Agriculture The  
 National Academy of Sciences The National Research Council 264  
 pages W B Saunders Co Philadelphia Pa 1957

FUNDAMENTALS OF HUMAN PHYSIOLOGY for Students in the Medical  
 Sciences by W B Youmans Ph O M D 567 pages illustrated The  
 Year Book Publishers Inc Chicago Ill 1957 Price \$3 50

ANESTHESIA A Manual for Students and Physicians by Stuart C Cullen  
 M O 5th edition 295 pages illustrated The Year Book Publishers  
 Inc Chicago Ill 1957 Price \$3 50

THE EFFECTS OF NUCLEAR WEAPONS edited by Samuel Glasstone  
 Prepared by the United States Department of Defense (Air Force Pam-  
 phlet No 136 13). Published by the United States Atomic Energy  
 Commission June 1957 379 pages illustrated For sale by the Sup-  
 erintendent of Documents U S Government Printing Office Wash-  
 ington 25 O C Price \$2 (paper bound)

DISEASES OF THE EXTERNAL EAR by Ben H Senturia A B M D Amer-  
 ican Lecture Series Publication No 319 A Monograph in The Banner  
 stone Division of American Lectures in Otolaryngology edited by  
 Norton Canfield M D 211 pages illustrated Charles C Thomas  
 Publisher Springfield Ill 1957 Price \$3 50

SURGICAL TECHNIQUE and Principles of Operative Surgery by A V Part  
 10 M O F A C S Foreword by Alton Ochsner M D F A C S  
 6th edition 966 pages 1235 illustrations on 719 figures 4 in color  
 Lea & Febiger Philadelphia Pa 1957 Price \$20

METHODS IN SURGICAL PATHOLOGY by Henry A Teloh M D 127 pages  
 Charles C Thomas Publisher Springfield Ill 1957 Price \$4 75

THE BASES OF TREATMENT by Newton S Stern A B M O and Thomas  
 N Stern M D 176 pages Charles C Thomas Publisher Springfield,  
 Ill 1957 Price \$4 75

THE DERMATOLOGIST'S HANDBOOK by Ashton L Welsh M S M D Amer-  
 ican Lecture Series Publication No 293 A Monograph in The Banner-  
 stone Division of American Lectures in Dermatology edited by Arthur  
 C Curtis M D 427 pages Charles C Thomas Publisher Springfield  
 Ill 1957 Price \$15

THE MALABSORPTION SYNDROME A Mount Sinai Hospital Monograph Editor  
 David Adlerberg M O Contributions to the Symposium by Members  
 of the Staff of the Mount Sinai Hospital New York 252 pages illustrated  
 Grune & Stratton Inc New York N Y 1957 Price \$5 50

VOL VIII

DECEMBER 1956

NO 17

# UNITED STATES ARMED FORCES MEDICAL JOURNAL

*Published Monthly for  
the Armed Forces Medical Education Agency  
Department of Defense*



*Editor*  
CAPTAIN BENNETT F. ASHBY, MC, USA

*Associate Editors*  
COLONEL ROBERT S. ANDERSON, MC, USA  
COLONEL ROBERT J. BENIORD, USAI (MC)

*Assistant Editor*  
LIEUTENANT ROBERT DRYAN, MC, USNR

UNITED STATES  
GOVERNMENT PRINTING OFFICE  
WASHINGTON 1957

THE PRINTING OF THIS PUBLICATION HAS BEEN APPROVED BY  
THE DIRECTOR OF THE BUREAU OF THE BUDGET, 20 FEB 1956

## Monthly Message

I am happy to report some early observations on Public Law 497 Medical and Dental Officer Career Incentive Act and Public Law 569, authorizing medical care for dependents of members of the uniformed services.

First as to Public Law 497 in all three services the resignations have diminished and applications for commissions as regular officers have increased. This is heartening because as this situation comes into balance the need for requesting physicians and dentists by mechanism of Selective Service decreases. As a result no calls are foreseen for 1958.

As to Public Law 569 this has now been in operation since December 7, 1956 under the executive direction of Major General Paul I. Robinson MC USA. General Robinson is well known throughout the civilian medical profession as well as the military, and has been carrying forward with a rare ability in matters pertaining to personnel which he possesses. Under his direction relatively few serious problems have arisen. He is collecting and tabulating these as they arise, and will make a report on the operation of this law to the consultant group appointed by the Secretary of Defense in the late spring. Doubtless changes will be necessary, but all of us hope that under the skillful direction of General Robinson these will be comparatively few and all designed to perfect the operation of the Act.

*Frank B. Berry*

FRANK B. BERRY M D  
Assistant Secretary of Defense  
(Health and Medical)





## DEPARTMENTS—Continued

Officers Attend Preventive Medicine Conference at Fort Carson Colorado.....	1842
Walter Reed Cardiologist Promoted .....	1843
Fort Banning Hospital Inspected.....	1843
Phonograph Records Aid Teaching.....	1844
Correspondence.....	1845
Dental Courses Announced .....	1846

## BOOK

Review of Recent Book.....	1847
----------------------------	------

INDEX.....	1848
------------	------

---

## Foreword

The *United States Armed Forces Medical Journal* is the medium for disseminating information of administrative and professional interest to all medical personnel of the Department of Defense. The Assistant Secretary of Defense (Health and Medical) and the Surgeons General of the several services invite all medical officers, dental officers, Medical Service Corps officers, Nurse Corps officers, and officers of the Veterinary Corps of the Armed Forces, and the medical consultants of the Army, Navy, and Air Force to submit manuscripts for publication in this journal.

FRANK B. BERRY, M. D.  
*Assistant Secretary of Defense (Health and Medical)*

MAJOR GENERAL SILAS B. HAYS  
*Surgeon General, United States Army*

REAR ADMIRAL BARTHOLOMEW W. HOGAN  
*Surgeon General, United States Navy*

MAJOR GENERAL DAN C. OGLE  
*Surgeon General, United States Air Force*

# UNITED STATES ARMED FORCES MEDICAL JOURNAL

Volume VIII

December 1957

Number 12

## A SHIPBOARD EPIDEMIC OF ASIAN INFLUENZA

DAVID C. WHITE Lieutenant MC USNR

**A**N EPIDEMIC of Asian influenza occurred on the U S S *Valcour* (AVP 55). The ship was relatively isolated from external contamination once the initial contact had been made and the progression of this disease in a susceptible military population could be studied with a minimum of outside influences. The clinical impressions that the disease progresses in severity during a pandemic<sup>1</sup> and that lack of sleep and physical fatigue correlate with severity and sequelae<sup>2</sup> were examined. The severity of the epidemic was compared to the 1918-1919 pandemic as it occurred in military groups.

### EXPOSURE

On 27 and 28 June 1957, while returning from the Persian Gulf, the ship stopped at Aden, where there was an epidemic of Asian influenza. On 1 July the first case of influenza appeared among the crew. On the same day the ship met its relieving ship, the U S S *Greenwich Bay* (AVP 41) from which 11 men were transferred to the *Valcour*. Between 2 and 3 July, the ship traversed the Suez Canal and did not make any new contacts until it reached Naples, Italy, on 7 July. There was no Asian influenza in Naples at that time. No new cases appeared after 10 July and all cases were discharged by 14 July.

### DIAGNOSIS

An oral temperature of 102°F plus a history of chills, arthralgia, myalgia, and cough were criteria of admission into this

From Aviation Medical Acceleration Laboratory U S Naval Air Development Center  
Johnsville Pa

study. Of the 201 men on the ship 71 met all these criteria, yielding a total attack rate of 35.3 per cent. An additional 29 men exhibited symptoms and a temperature of over 99 F, which made it seem probable that they also had the infection. No attempt was made to check on the rest of the ship's company other than to make announcements in the Plan of the Day describing the prodromal symptoms and urging men with the symptoms to report to sick bay. The additional 29 men were those who felt ill enough to come to the sick bay of their own volition. With inclusion of these cases the attack rate was 49.8 per cent.

The 71 cases in this series were graded as to severity. Mild cases were defined as those without marked symptoms other than fever and with a duration of less than 4 days. Severe cases had more pronounced symptoms that lasted 5 to 8 days. Patients with secondary infections were those whose febrile course went from 101 or 102 F down to 99 F in 3 to 4 days and then after 6 to 8 hours returned to 102 F. These patients were given 500 mg of oxytetracycline four times a day as soon as this febrile trend was established, the fever in all but one case returning to 99 F in a few hours. Abnormal pulmonary sounds were noted in all these cases.

Patients were discharged after 36 hours of normal temperature. Only 2 of the 71 patients suffered relapses. All cases cleared without sequelae except for some patients who were left with a cough that gradually disappeared.

Table 1 gives a breakdown of the attack rates by severity for the total epidemic including the nonadmitted cases that were treated as outpatients.

TABLE 1. *Attack rate of Asian influenza in crew of 201 by severity*

Severity	Number	Pct cent
Ambulatory	29	14.4
Mild	47	23.4
Severe	13	6.5
Antibiotics for secondary infection	11	5.5
Total	100	49.8

All patients were men 17 to 45 years old who met the physical standards for active duty in the Navy.

Four paired sera from patients admitted to sick bay were tested at Preventive Medicine Unit No. 2 Norfolk, Va. and two of the sera showed marked reactions in the specific hemagglutination

inhibition test to the antigen of Earle's isolate A/Japan/70, 57 the Asian influenza virus.

Sera were also tested against influenza types A/PR8/34, A/FM1/50 (A/Denver/57) B/GI/54 and B/Isc/10. These sera showed no significant rise in titer. This result is considered definite evidence that the epidemic was the Asian type of influenza.

### SYMPTOMS

In the majority of cases the disease began either with coryza and a gradually increasing headache, or suddenly with a shivering chill. All cases developed a significant fever, 102°F or more at some time during the disease. Table 2 presents a summary of the symptoms that were reported by the patients. As most pronounced migratory arthralgia without overt arthritis was common,

TABLE 2. Symptoms, signs and severity of Asian influenza in patients placed in sick bay during first, middle and last periods of epidemic.

Symptom, sign or severity	Per cent of total group of 71 cases	Per cent of first 25 cases	Per cent of middle 21 cases	Per cent of last 25 cases
Headache	39	32	33	48
Arthralgia	34	70	33	48
Myalgia	49	56	48	44
Chills	49	48	38	60
Cough	37	36	48	28
Diarrhea	11	12	10	12
Asthenia	13	12	24	4
Sore throat	10	20	5	4
Rales right lung base	34	16	38	48
Rales left lung base	17	8	29	16
Mild infection	66	68	76	56
Severe infection	18	16	14	24
Antibiotics for Secondary infection	15	16	10	20

as was myalgia, which caused considerable discomfort. Some of the patients complained often of a severe backache at the base of the back. The cough tended to follow the rise in temperature by about 24 hours, and was associated with fine rales in less than half the cases. Asthenia, so common in pandemic influenza,<sup>2</sup> was of little importance in this epidemic. Rales tended to be found most often at the right lung base, and usually developed during

the second or third day of the infection Sore throat coupled with an "injected" pharynx occurred frequently

### STATISTICS

In this paper the number in a category was compared to the expected values predicted from the behavior of the total epidemic and tested by the chi square technique The expected value was derived as follows If A was the value of a certain category in group n and B the value of the same category in a larger group z, the expected value of B was equivalent to B times the total number of cases in group a divided by the total number of cases in group z This expected value was then compared to A by the chi square technique Yates' correction was used where the number of cases was less than 5 and/or where the degrees of freedom were less than 3 For a difference to have been statistically significant in this study it must have differed to the 1 per cent level of confidence

### PROGRESSION AND SEVERITY OF SYMPTOMS

To test whether the severity of the disease changed during the epidemic the first 25 cases admitted between 1 and 5 July the middle 21 cases and the last 25 cases admitted after 6 July are compared in table 2 Testing each category of these three groups against the corresponding value as predicted from the total group showed no significant variation in the symptoms or severity during the course of the epidemic The average initial temperature (101.9 F) and the average time spent on the sick list (2.9 days) also showed no significant variation between the three groups or from the total group

Using the grades of severity outlined above and comparing the average maximum temperature for each group to that for the total epidemic there was no significant relationship between severity of influenza and maximum temperature

### EFFECT OF BERTHING AND WORKING CONDITIONS

During the epidemic the *Valcour* had a total complement of 13 officers, 7 chief petty officers, and 181 enlisted men The men were classified into divisions by occupational and berthing assignments (fig 1) After 2 July the "Flag" compartment was used as an isolation ward and the men were transferred to bunks in the V and \ division compartment The divisions followed standard Navy designators The men who transferred from the U S S *Greenwich Bay* were put with the V and \ division The M division contained the ship's engineers All of these men slept in the same compartment and all but the shipfitters worked in close association in the engine rooms First division personnel worked about the deck and were less confined during the working day Personnel of divisions V, \, O, N, and F the stewards, the

chiefs, and the officer over in smaller, rooms had more ordinary jobs, and were distributed about the ship. Each compartment had a separate air conditioning system.

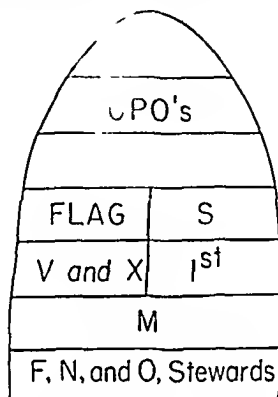


Figure 1. Berthing diagram of the U S S Valcour by divisions.

Statistically there was no significant difference between the number of men infected from each division and the number that would be expected as predicted from the total group (table 3). The distribution of severity of the infection in each division of the ship as compared to that expected from the total number of that severity reduced proportionately, also was not significant by the chi square test (table 4).

TABLE 3. Incidence of influenza by divisions.

Division	Number of men	Number infected	Number expected from total
M	58	22	20.5
S	30	7	10.6
First	31	14	11
O, N, F, stewards	43	17	15
V, X, transfers	19	7	7
chiefs, officers	20	4	7
Total	201	71	71

Calculated as follows:  $201 \times 71 = 58 \times 20.5$

TABLE 4 *Serotype features by division*

Division	Total number infected	Number with mild infection	Number expected to have mild infection	Number with severe infection	Number expected to have severe infection	Number exposed to an "boost" for secondary infection	Number expected to require antibiotic for secondary infection
M	22	14	14.6	3	4.0	5	3.4
S	7	7	4.6	0	1.3	0	1.1
First	14	9	9.3	4	2.6	1	1
O N F ward	17	8	11.3	5	3.1	4	6
V Y, and ran for	7	6	4.6	1	1.3	0	1.1
Ch 1 and officer	4	3	2.6	0	1.1	1	0.6
Total	71	44	47	13	13	11	11

\*Calculated by using  $\chi^2$  test,  $p < .05$ 

## INCIDENCE BY DAYS

Figure 2 indicates the number of men of each group who were disabled each day. The striking onset in M division on 4 July correlated with the long watch and the rapid change in temperature while traversing the Suez Canal. The men repeatedly went from the hot engine room to the cooler deck to see the canal. While on deck they stripped to get a sun tan and were chilled by the deceptively cool breeze. The ease of droplet spread and greater virus stability in the hot moist engine room might also have explained this sudden onset.<sup>3</sup>

## CONTROL

Because of the cramped shipboard berthing quarters and the nature of the ship's air conditioning system it was impossible to isolate patients at less than the division level. As soon as cases were detected they were isolated in a separate compartment but with a "head" common to the rest of the crew. This appeared to have little effect on the spread of the disease. The incubation period seemed to be about 48 hours during which time the only symptom was a nonspecific coryza. Using the chi square test neither the attack rate nor the daily incidence rate of those who were not exposed at Aden differ significantly from the rates of those who were exposed in Aden.

## COMPARISON WITH THE 1918-1919 PANDEMIC

The epidemic of influenza observed by Opie and associates<sup>4</sup> in 1918 at Camp Pike occurred in a relatively isolated military population much like that involved in the present study. The 100 consecutive cases reported from the height of the 1918 epidemic

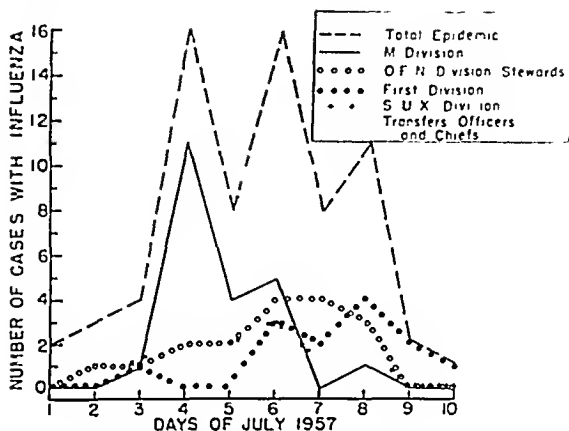


Figure 2 Daily incidence of epidemic by divisions

were similar to the 71 observed in 1957, with minor exceptions. Epistaxis, which was not seen in the 1957 series, occurred 12 times in the 1918 group. On the other hand asthenia and diarrhea were significantly more prominent in the current series.

Dudley<sup>2</sup> reported 368 cases seen on the hospital ship H. M. S. *Agadir* in the late fall and winter of 1918 to 1919. The pandemic reportedly was more severe as it progressed and, in addition, the series seen on a hospital ship presumably would have been weighted toward the more severe cases. About 6 per cent of the 368 patients died of pneumonia, whereas there were no deaths in the current series. There also was a longer duration of fever in uncomplicated cases of the *Agadir* group. This is shown in figure 3, in which the duration of fever is plotted against that for corresponding groups in the other two series. Fevers recurring after 48 hours of normal temperature were not included.

It can be seen from table 5 that the range of severity and complicating pneumonitis in patients seen in 1957 was similar to that in the 1918 to 1919 reports, with the exception that no deaths occurred.



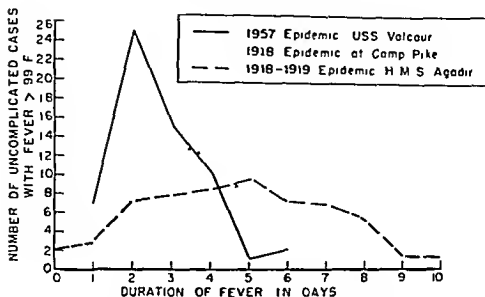


Figure 3 Comparison of duration of fever in uncomplicated influenza in the 1957 and the 1918-1919 epidemics.

TABLE 5 Comparison of severity of 1957 epidemic and 1918-1919 pandemic

Severity	Valcour (1957) 71 cases		Opic et al. <sup>4</sup> (1918) 100 cases		Dudley (1919) 368 cases	
	Number	Percent	Number	Percent	Number	Percent
Uncomplicated	47	66	64	64	285	77
Cases with pulmonary signs	24	34	36	36		
Pneumonias with fever	11	15	15	15	83	23

### COMMENTS

It appears that either repeated chilling and heating and loss of sleep or the working conditions of the engineering division could make the infection spread more rapidly. There was no evidence that the infection which appeared more quickly in this way was any more severe or led to more sequelae. The officers, who were better isolated, suffered a specific attack rate not significantly different from the crew. Face masks were not used. The disease could be controlled adequately with symptomatic therapy and antibiotics were used only when pneumonitis appeared as a complication following partial recovery. The predominance of pulmonary cases in the right base as compared to those in the left base was not significant.

The 1957 epidemic here reported, when compared to two studies on similar populations during the 1918-1919 pandemic showed striking similarities in symptomatology and severity. The only important differences lay in the prevention of secondary pneumonia with antibiotics and in the fact that no deaths occurred. The deaths in the Lyadir 1918 to 1919 series were caused by pneumonia.

In the course of the epidemic all three of the Medical Department representatives on the ship became infected. This relatively mild infection disabled a considerable portion of the ship's company, if it had been more virulent it could have disabled the entire ship and rendered it ineffective as a fighting unit.

### SUMMARY

An epidemic of Asian influenza aboard a relatively isolated naval ship disabled 35.3 per cent of the ship's company for varying lengths of time over a period of 14 days. The natural history of the epidemic in this closed environment was examined statistically. There was no evidence that the epidemic changed progressively in severity or that the amount and type of physical labor affected its severity or overall incidence. There was evidence that either repeated chilling or confinement in a warm, moist environment could cause the infection to spread more rapidly, but the infection thus spread was not more virulent. A comparison with two studies of the 1918-1919 pandemic in similar military populations showed no significant differences in severity. Control measures were not effective and the infection proved to be a grave military hazard.

---

**ACKNOWLEDGMENT** The author wishes to thank Lieutenant R. D. Alexander, MSC USN and Lieutenant (jg) W. R. Sanborn, MSC USN of Preventive Medicine Unit No. 2 Naval Operations Base Norfolk Va. for their help in identifying the virus.

### REFERENCES

1. Dochez R. A. Influenza. In New York Academy of Medicine Committee on Public Health Relations. *Preventive Medicine In Modern Practice* 3d edition. Edited by J. A. Miller, G. Baehr and E. H. L. Corwin. Paul B. Hoeber Inc. New York, N. Y. 1942 p. 210.
2. Dudley S. F. Influenza pandemic as seen at Scapa Flow. *J. Roy. Nav. Med. Serv.* 5: 359-380 Oct 1919.
3. Christian H. A. Influenza. In Christian H. A. (editor) *Oxford Medicine*. Oxford University Press, New York, N. Y. 1948 Vol. 4 part 5 p. 844.
4. Opie E. L., Blake F. G., Small J. C., Rivers T. M. *Epidemic Respiratory Disease*. C. V. Mosby Co. St. Louis, Mo. 1921 pp. 53-54, 80.

# USE OF THE BATROW NEUROMUSCULAR STIMULATOR FOR INDUCING RESPIRATION IN GB POISONED ANIMALS

FRED W OBERST *Ph.D.*  
WILTON A CHRISTENSEN *B.A.*  
JAMES W CROOK *B.S.*  
PAUL CRESTHULL *B.S.*

SEVERAL methods of artificial respiration have been found effective in resuscitating GB\* poisoned animals. Oberst and associates<sup>1</sup> found no appreciable difference between the effectiveness of the mask and the tracheal tube methods of artificial respiration in resuscitating dogs exposed by inhalation to 3 to 40 lethal doses of GB vapor.

In recent years several electric stimulators have appeared on the market each having characteristics supposedly useful in inducing artificial respiration. Sarnoff, Herdenbergh, and Whittenberger<sup>2</sup> described an apparatus\*\* capable of producing artificial respiration by electric stimulation of one or both phrenic nerves. The stimulus is a series of impulses the voltage of which rises and falls in such a way as to produce effective diaphragmatic contraction and relaxation. Sarnoff, Herdenbergh and Whittenberger<sup>2</sup> reported that effective respiratory activity could be induced, and that the technique was capable of maintaining normal partial pressures of oxygen and carbon dioxide in the arterial blood of experimental animals and in man, in the absence of spontaneous respiration. In unpublished experiments carried out by Wills and his associates<sup>3</sup> this type of stimulator did not produce effective artificial respiration in dogs poisoned with lethal doses of GB.

The Batrow neuromuscular stimulator\*\*\* is another type of electric stimulator that generates a current effective in producing muscular contraction. Essentially it consists of a generator capable of delivering from 17 to 20 microamperes at 25,000 to 60,000 volts in a series of highly damped 7 microsecond oscillations.

From Toxicology Division, Chemical Warfare Laboratories, U. S. Army Chemical Center, Md.

\*Nerve gas with the chemical name of diisopropylmethylphosphonofluoridate.

The Sarnoff Electrophrenic Stimulator is manufactured by Sanborn Co., Cambridge, Mass.

Made by Batrow Laboratories, Branford, Conn.

This apparatus has been proposed for treatment of certain types of neuromuscular dysfunctions. The manufacturer also has suggested its use for resuscitating drowning and smoke victims by stimulation of the diaphragmatic muscles.

In our studies the Bntrow neuromuscular stimulator was tested for its effectiveness in resuscitating dogs and Rhesus monkeys poisoned by inhalation of lethal concentrations of GB vapor.

### METHODS AND MATERIALS

Six dogs, each weighing, approximately 10 kg, were shaved in the abdominothoracic area where the stimulating electrode (applicator) was to be placed, and an area on the back also was shaved for placing the return plate (ground). To ensure good electric contact, both the stimulating electrode and the return plate were wrapped in a cloth dampened with tap water. A tracheal tube with a Sanders cuff was inserted into each dog. The tube was connected by a 2 way valve and short rubber tubing to a small Collins gasometer equipped with a pen and kymograph for recording air movements. For dogs, a surge setting of 5, a pulse setting of 3, and an intensity setting of 8 on the apparatus appeared to give the best physical response of the chest wall and diaphragm, but other settings were also tried.

Rhesus monkeys weighing from 3 to 6 kg were not shaved for placement of the electrodes, but the instrument settings used were similar to those for the dog.

In preliminary tests, 3 of the 6 dogs were used to test the action of the stimulator on respiration at various instrument settings and positions of the stimulating electrode. These animals also served as controls for dogs exposed by inhalation to GB vapor. One of the control dogs received Nembutal (brand of pentobarbital sodium), one, curare, and another, a combination of those drugs. All GB exposed dogs and monkeys, except one, received atropine (5 mg per kg of body weight for the dog, and 2 mg per kg for the monkey) intramuscularly one half to three minutes after the one minute inhalation exposure. One monkey did not receive atropine.

### RESULTS

**Dogs.** Alterations in the respiratory rate and volume due to electric stimulation were studied on the nembutalized dog. Subjective observations on this animal indicated that the tidal volume was not altered appreciably, however, at increased intensities the rate of respiration was synchronized with the rate setting on the instrument. Another animal received sufficient curare to inhibit respiration completely. The electrostimulator caused marked, spastic like chest movements but did not move an appreciable amount of air as observed by the recordings on the kymograph.

The dog showed marked signs of anoxia and was dead 5 to 6 minutes after the curaro injection

On the basis of the foregoing results a third animal was first given Nembutal, and then curaro was administered intravenously in dosages which lowered the respiratory rate and volume. Application of electrostimulation did not increase the tidal volume but the frequency of respiratory activity could be controlled by the pulse setting on the instrument. The same results were noted after additional administration of curare which caused a further lowering of respiratory rate and volume. When sufficient curaro was administered to inhibit respiration completely, the electrostimulator caused muscular contractions that appeared spastic in nature, but little or no respiratory ventilation occurred. The animal became hypoxic and would have died under these conditions of treatment. When death was imminent, the operator disconnected the tracheal tube from the spirometer and connected it to a mechanical resuscitator. In a short time the color of the tongue and mouth changed from dark blue to pink, indicating effective pulmonary ventilation. After a few minutes, the method of respiration was changed to the electrostimulator, and the same condition of anoxia occurred as before and the animal was again on the verge of death. Once more, mechanical respiration was effective in relieving the animal's anoxic condition.

Three dogs were exposed to GB vapor, equivalent to approximately 3 LCt50's\* (187 mg min/m<sup>3</sup>). After the exposure they were treated with atropine followed immediately by electrostimulation. In the first animal atropine was administered and electrostimulation was initiated three minutes after exposure. Spontaneous respiration had ceased by this time. Electrostimulation caused vigorous muscular action synchronous with the rate set on the instrument but did not move an appreciable amount of air as recorded on the kymograph. The dog did not show signs of spontaneous respiration and was dead within three to four minutes after resuscitation was initiated. In previous experiments on dogs similarly poisoned with GB a mechanical respirator saved the animals. Because treatment in the foregoing animal was not started until respiration had ceased the experiment was repeated on a second animal except that treatment was started one-half minute after the exposure and while spontaneous respiration was still in effect. The outcome was as unsuccessful as before. When spontaneous respiration ceased the electrostimulation did not produce adequate respiration. In the third dog treated one-half minute after exposure to GB vapor, electrostimulation failed to maintain adequate ventilation. When anoxia became severe and the animal appeared to be dying the tracheal tube leading to the

LCt50—the prod ct of apor conc and time d time of exposure resulting in 50 per cent lethality —Editor

spirometer was disconnected. One of us ventilated the blowing through the tube into the dog's lungs. Within 10 minutes color improved, and within another two minutes respiration became spontaneous. There is no question but that the animal could have died under electrostimulation.

**Rhesus Monkeys.** The results in five rhesus monkeys are shown in table 1. All except one received atropine. Electrostimulation was started at approximately the same time as the atropine administration. The results show that the electrostimulation was not effective. The only monkey that survived never stopped breathing and received atropine early, one half minute after the exposure.

TABLE 1. Evaluation of the Batrow neuromuscular stimulus on five rhesus monkeys poisoned with GB.

Subject	Time for appearance of toxic signs (in minutes)		Time of atropine administration (in minutes)	Initiation of electrostimulation (in minutes)	Approximate time of death (in minutes)
	Tremors	Convulsions			
1	0.5		None	0.5	6
2		None	0.5	0.5	Survived
3		1.7	1.7	2.0	10
4		1.5	1.0	0.5	12
5	0.2		0.3	0.5	5

The times recorded in the table commence at the end of the 1 minute exposure.  
*Cardiac arrest.*

There is no doubt from past experience that all the atropinized animals would have survived, if effective artificial respiration had been employed. In the animal receiving no atropine, life could have been supported for a considerable time by means of a good mechanical respirator.

#### DISCUSSION

While the Batrow neuromuscular stimulator may be very useful for stimulation of muscles, it is not an effective device for artificial respiration. It did not produce the necessary alternations between the inspiratory and expiratory muscles which are essential for adequate ventilation. The inspiratory muscle effects that resulted from stimulation with the applicator placed over the diaphragm were probably counteracted by the simultaneous stimulation of the expiratory muscles. When the intensity was set high enough to give strong contractions, contractions were of a spastic nature. Regardless of whether curare or GB poisoning caused the neuromuscular block, as studied here, the resuscitator was unable to overcome the block.

## SUMMARY

The Batrow neuromuscular stimulator in conjunction with atropine therapy was evaluated as an electric resuscitator in dogs and monkeys poisoned with lethal amounts of GB vapor. Two curarized dogs also were used in these experiments. The stimulator was ineffective in resuscitating these animals. It caused spastic like contraction of the respiratory muscles but did not cause respiratory exchange adequate for survival.

## REFERENCES

- 1 Oberst, F. W., Pose, R. S., Christensen, M. K., Crook, J. W., Cresthill, P. and Dmland, C. W. II. Resuscitation of dogs poisoned by inhalation of nerve gas GB. *Am. Med. Soc.* 119: 377-386, Dec. 1936.
- 2 Sarnoff, S. J., Hardenbergh, E. and Whittenberger, J. L. Electrophrenic respiration. *Science* 108: 482, Oct. 29, 1948.
- 3 Sarnoff, S. J., Hardenbergh, E. and Whittenberger, J. L. Electrophrenic respiration. *Am. J. Physiol.* 155: 19, Oct. 1948.
- 4 Whittenberger, J. L., Sarnoff, S. J. and Hardenbergh, E. Electrophrenic respiration: its use in man. *J. Clin. Investigation* 28: 124-128, Jan. 1949.
- 5 Wills, J. H., Personal communication.

## CHRONIC FEARFULNESS

"Everyone recognizes that there are diseases of the body and diseases of the mind. Many thoughtful people believe that there are also diseases of the spirit, important in themselves and capable of producing pronounced secondary disorders of body and mind. Spiritual disorders include pride, jealousy, greed, self-pity, resentment, self-indulgence, and chronic fearfulness. As an example of the latter I may tell you of an eminent surgeon who had a patient with a dangerous and painful illness requiring an operation involving serious risk. She showed great courage and endurance in contrast to her husband who was a worrying little man, fussy over trifles and consumed by fearfulness. Many times during those difficult weeks he telephoned or visited the surgeon about trivialities. Eventually the patient reached a stage of convalescence. One day, again by special appointment the husband came to the surgeon and asked, 'Mr. Jones, do you think I ought to get a bath chair?' The harassed surgeon answered crisply, 'You can if you like, but I don't think she's strong enough yet to push you around.'

—R. W. LUXTON, M.D.  
in *British Medical Journal*  
p. 546, Sept. 7, 1957

# INFERIOR DEEP CERVICAL LYMPH NODE BIOPSY

JACK R. JAY, Major, USAF

THOMAS H. HEFFERTY, Lieutenant Colonel, USAF

**I**N 1949 Daniels<sup>1</sup> described a method of biopsy useful in diagnosing certain intrathoracic diseases. He reported five cases. Since then several large series of cases substantiating the usefulness of the procedure have been reported.<sup>2-4</sup> As a result of these reports this operation gained wide acceptance until it became apparent that it produced large numbers of false negative results. Because of this, the procedure has now fallen into some disrepute. The purpose of this article is to discuss some of the causes for the inaccurate results, and to emphasize some important points designed to improve the diagnostic accuracy of this operation.

Names such as supraclavicular lymph node biopsy, retroclavicular lymph node biopsy, and prescalene lymph node biopsy have been applied to this procedure. It is thought, however, that none of these adequately describe the location of the lymph nodes to be excised. The lymph nodes alluded to lie on the anterior scalene muscle and around the junction of the subclavian and internal jugular veins. These nodes have always been called the inferior deep cervical lymph nodes,<sup>5,6</sup> and although the other titles may have brevity to commend them, this advantage is lost by their clouded anatomic connotation. Because of the use of the above vague and varied terminology, the exact material to be excised has frequently been overlooked. Often, as illustrated in our series of 74 consecutive cases, no lymph nodes were found in the specimen (table 1). Twenty five and sixteenth parts per cent contained no material of value in diagnosing spread of intrathoracic disease. Most of the biopsies in this series were performed by junior house officers. A 2- to 4 cm incision was made, and the entire operation took about one half hour to complete.

Emphasis must be placed on the fact that many different surgeons, primarily first- and second year residents, performed the

---

From U. S. Air Force Hospital, Scott Air Force Base, Ill., and Brooke Army Hospital, Brooke Army Medical Center, Fort Sam Houston, Tex.



TABLE 1 *Diagnostic biopsy of inferior deep cervical lymph node in 74 consecutive patients*

Final diagnosis	Number	Node biopsy		
		Negative (number)	Positive	
			Number	Per cent
Sarcoid	22	16	6	27.2
Carcinoma	18	14	4	22.2
Mediastinal tumor	5	5	0	0
Inflammation	11	11	0	0
Tuberculosis	5	4	1	20.0
Lymphoma	3	1	2	66.6
Carcinoma esophagus	1	1	0	0
Miscellaneous	9	9	0	0
Total	74	61	13	

Biopsy of no value in diagnosis..... 61

Biopsy obviated necessity of operation..... 13

Clinically enlarged nodes with positive biopsy..... 6

Carcinoma..... 3

Lymphoma..... 2

Sarcoid..... 1

Impalpable or occult nodes with positive biopsy..... 7 = 10.3 per cent

Carcinoma..... 1

Sarcoid..... 5

Tuberculosis..... 1

Biopsy negative but positive tissue diagnosis made..... 39

Thoracotomy..... 32

Bronchoscopy..... 4

Papanicolaou smear..... 2

Autopsy..... 1

Biopsies containing no lymph nodes..... 12 } 25.6 per cent

Biopsies containing lymphoid aggregates only..... 7 }

Final diagnosis confirmed by lymph node biopsy..... 13

Total number of cases studied..... 74

surgical procedure on this group of patients. The method of biopsy used was that described by Daniels.

The failures, of course, cannot be ascribed to lack of clear description of the operative technique inasmuch as this has been adequately accomplished by several writers. Rather, we believe that the failure lies primarily in the fact that this procedure is thought of as a simple, 10 minute operation without mortality or morbidity. Accordingly, the most junior member of the sur-

sical staff has been assigned to delve among the great vessels at the base of the neck and extract the fat pad lying on the anterior scalene muscle, hoping thereby to remove some or all of the inferior deep cervical lymph nodes. This, as is amply illustrated by our series of patients does not produce the desired diagnostic results. In our opinion it requires a 5 to 6 cm incision for adequate exposure, and about one hour of a trained surgeon's time to safely extract the elusive deep lying lymph nodes from their hiding places about the subclavian and internal jugular veins. The surgeon, in addition, must be interested in and aware of the problems inherent in this procedure. Obviously enlarged and palpable lymph nodes at the base of the neck in the subclavian triangle present no major surgical problems, and the incidence of positive results under these circumstances is very high indeed. It is the occult, small, impalpable node that escapes our eye and finger, and for which we must diligently search if we are to improve our diagnostic ability and thereby prevent needless surgery of benign and/or inoperable malignant lesions. In our series only 10.3 per cent of occult nodes were positive.

Selection of the side of operation also plays an important role to increase diagnostic accuracy. As emphasized by Harken and associates<sup>7</sup> and Connor,<sup>8</sup> the description of the lymphatic drainage of the lung by Rouviere,<sup>9</sup> indicates that the right lung and the lower two thirds of the left lung drain eventually to the right inferior deep cervical and mediastinal lymph nodes, whereas the upper one third of the left lung only drains to the left side of the mediastinum and neck. This finding, naturally, locates the side of incision. However the finding of negative lymph nodes in an adequate, right, deep cervical lymph node biopsy, performed for a lesion in the lower two thirds of the left lung, probably should indicate the need for biopsy on the opposite side. One patient in the series reported had a left lower lobe lesion. A left, inferior deep cervical lymph node biopsy was performed with positive results.

Cervicomedastinal biopsy, as advocated by Harken and associates, has not as yet won general approval, however, it may eventually be the procedure of choice. Connor reported an incidence of 31 per cent positive inferior deep cervical lymph node without mediastinal biopsy in cases with a proven diagnosis of carcinoma of the lung. This latter figure, when examined, reveals that it includes six cases of palpable nodes and thus, if it is to be compared with that of Harken and associates (39.8 per cent), must exclude those cases, giving a true incidence of 26 per cent positive biopsies. This may represent a significant difference between these two procedures. Those figures reported by Shefts, Terrill, and Swindell<sup>4</sup> do not state if nodes were palpable and thus cannot be readily compared. However, it is interesting to note that their incidence of positive biopsies was lower than that

reported by Harken and associates. Even with the high incidence of positive biopsies using the method advocated by Harken and associates the increased discomfort the patient experiences, plus the possibility of damage to the great vessels, makes one slow to accept such a procedure.

Finally routine inferior deep cervical lymph node biopsy is not indicated in all pulmonary lesions. Only those lesions showing a high incidence of positive lymph nodes in the operative specimen should be included.

These collected cases (listed in table 2) indicate there is little value in biopsy when a mediastinal tumor carcinoma of the esophagus or intrathoracic metastasis is suspected. In addition a hilar or pulmonary lesion suspected as being tuberculous seems to give few positive results. Table 3 also indicates that there is a rather wide range of positive results reported from different institutions and that therefore defects in technique or ability to find pathologic nodes must exist.

The figures shown in table 3 indicate the per cent of the final diagnosis (established by all methods) that was made by inferior deep cervical lymph node biopsy. Some of the authors quoted this percentage figure on only one diagnosis and consequently the total cases indicated are those relative to that diagnosis alone.<sup>4, 7, 10</sup>

It is to be noted that a number of patients reported on by Carstensen, Norvitt and Odolberg<sup>10</sup> had clinically palpable nodes, and Shefts, Terrill and Swindell did not indicate if the nodes found in the patients were palpable preoperatively. This of course may account for the high range of diagnostic accuracy reported in their studies. The problem most commonly encountered is that of a pulmonary or mediastinal lesion without palpable inferior deep cervical lymphadenopathy, and this therefore should be the test for procedure accuracy.

#### SUMMARY

In a series of 74 consecutive cases of inferior deep cervical lymph node biopsy it is emphasized that this is not a minor surgical procedure to be delegated to the most junior member of the surgical staff. In this series of cases the operation was performed by different physicians, ranging from intern to fully trained surgeon. Most of the procedures were performed by first and second year residents. The selection of the side of operation based on the lymphatic drainage of the lungs is an important facet in increasing the diagnostic accuracy of the procedure. Not all pulmonary lesions yield a high incidence of positive inferior cervical lymph node biopsy. The most important criterion in evaluating this procedure is its incidence of positive lymph

TABLE 2 Summary of diagnoses in collected series of inferior deep cervical lymph node biopsy

Author	Number	Sarcoid	Carcinoma	Tuberculosis	Fungal diseases	Mediastinal tumor	Lymphoma	Cancer noma of esophagus	Miscellaneous diseases	Isolated thoracic metastases	Positive biopsy diagnosis	
											Number	Percent
Jay and Hewlett	74	6	4	1			2				13	17.5
Pipe <sup>11</sup>	185	31	10	3	3		4			1	52	27.8
Cuykendall <sup>2</sup>	41	4	3				1				9	19.5
Ilkoken and associates <sup>7</sup>	142	7	31	2			2	2	1		45	31.7
Connar <sup>8</sup>	50	4	9				1				14	28.0
Shefts and associates <sup>4</sup>	187	38	13	8	1		4			3	67	35.7
Carstensen and associates <sup>10</sup>	56	31		3					2		36	64.2

TABLE 3 Accuracy of preoperative lymph node biopsy procedures in resection

Author	Number of cases	Percentage				
		Standard	Carcinoma	Tuberculosis	Metastatic tumor	Lymphoma
Hicken and associates	78		59.8			
Conna	50	80.0	31.0			100.0
Cuyke and Li	41	100.0	21.4			100.0
J and Hewlett	4	2.2	2.2	0.0		66.6
Carstensen and associate	40	66.0				
Shiff and associate	4		54.00			

nodes in the face of clinically impalpable inferior deep cervical nodes

## REFERENCES

1. D. N. L. A. C. Method of biopsy useful in diagnosis of certain intrathoracic diseases. *Dis. of Chest* 16:360-366 Sept 1949
2. Cuykendall J. H. Use of preoperative lymph node biopsy in absence of palpable supraclavicular nodes: report of 41 cases. *J. A. M. A.* 155:741-742 June 19 1954
3. Strey C. F. and Reynold B. M. Biopsy techniques in diagnosis of intrathoracic lesions including lung biopsy, mediastinal biopsy and resection of deep cervical lymph nodes and its correlation of nodes: report of 12 illustrative cases. *Dis. of Chest* 23:357-382 Apr 1953
4. Shefts L. M. T. Still A. A. and Swaid H. H. Scale node biopsy. *Am. Rev. Tuberc.* 68:505-522 Oct 1953
5. Schiffer J. P. (ed.) *Morris Human Anatomy* 10th edition. The Blakiston Co. New York N. Y. 1942 reprinted in 1947 p. 804
6. Gray H. *Anatomy of the Human Body* Edited by Charles Mayo Goss 25th edition. Lea & Febiger Philadelphia Pa. 1948 p. 699
7. Harkness D. E. Black H. C. L. and Farrand R. E. Simple resection of the pleurotomy for diagnosis of intrathoracic disease with comments on recognition of inoperable carcinoma of lung. *New England J. Med.* 251:1041-1044 Dec 1954
8. Connor R. G. Pre-scalene and deep cervical lymph node biopsy. *Surg. Gynec. & Obst.* 101:733-743, Dec 1955
9. Rouviere H. *Anatomy of the Human Lymphatic System*, Translated from the original *Anatomie des lymphatiques de l'homme* and retranslated by M. J. Tobias. Edwards Brothers Inc. Ann Arbor Mich. 1938 Cited in references 7 and 8
10. Carstensen B. Norvick L. and Odelberg A. Experiences with resection of lymph node biopsy in diagnosis of certain intrathoracic diseases. *Dis. of Chest* 25:443-447 Apr 1954
11. Piper C. A. Scale node biopsy in diagnosis of diseases of chest. *Am. Pract. & Digest Treat.* 5:182-183 Mar 1954

# FORENSIC PSYCHIATRY IN THE ARMED FORCES

HARRY ROSENBERG, M.D.

**D**URING the past few years there has been an increasing interest in the problems of forensic psychiatry. Recent books by Zilboorg,<sup>1</sup> Overholser,<sup>2</sup> Biggs,<sup>3</sup> and Weisbaden<sup>4</sup> not only pointed up the old problems, such as the basic relationship between psychiatry and law, but raised many new questions. Although these problems have been explored extensively in civilian courts, little attention has been paid to them as they exist in the armed services.

The psychiatrist entering military life may wonder what is the military law in cases where insanity is a defense, and also what restrictions there will be, if any, on his psychiatric formulations based on his training and life experiences and evaluation of the patient, if asked to testify in a military court. It was my experience while in military service that most psychiatrists who first came into service believed that military life in itself was almost synonymous with some restrictions on their professional thinking and expression. This of course is not so, in fact, a careful review of recent cases shows that military courts are increasingly interested in psychiatric testimony and want more rather than less information.

This article will highlight four recent decisions, all of which have the common feature of emphasizing the importance of psychiatric testimony in the military court and the belief of the judges on the Court of Military Appeals, the highest legal tribunal in the military, that meaningful, dynamic psychiatry has an important place in the military courtroom.

The basic law of mental responsibility in the military is found in the *Manual for Courts-Martial*, and is as follows:

---

From Kings County Psychiatric Hospital Unit, Kings County Hospital Center, Brooklyn, N. Y. Dr. Rosenberg is now at 57 Flower Road, Valley Stream, N. Y.

Presented as part of a paper entitled *Current Problems and Progress in Forensic Psychiatry and The Law* at the panel on Military Medicine at the annual meeting of the American Psychiatric Association, April 1946.

A person is not mentally responsible in a criminal sense for an offense unless he was at the time so far free from mental defect disease or derangement as to be able concerning the particular act charged both to distinguish right from wrong and to adhere to the right.<sup>3</sup> The phrase "mental defect disease or derangement" comprehends those irrational states of mind that are the result of deterioration destruction or malfunction of the mental as distinguished from the moral faculties.

To constitute lack of mental responsibility the impairment must not only be the result of mental defect disease or derangement but must also completely deprive the accused of his ability to distinguish right from wrong or to adhere to the right as to the act charged. Thus a mere defect of character will power or behavior as manifested by one or more offenses ungovernable passion or otherwise does not necessarily indicate insanity even though it may demonstrate a diminution or impairment in ability to adhere to the right in respect to the act charged. Similarly mental disease as such does not always amount to mental irresponsibility. For example if a person commits an assault under psychotic delusion with a view to redressing or revenging some supposed injury to his reputation he is nevertheless mentally responsible if he knew at the time that the act was contrary to law and if he was not acting under an irresistible impulse. On the other hand an accused is not responsible for a particular homicide if as a result of mental disease he had an insane delusion that another person was in the act of attempting to kill him and he thereupon killed the supposed attacker under the delusion that it was necessary to kill the deceased to preserve his own life.<sup>4</sup>

Irresistible impulse as a defense also is permissible. The Durham rule has not been accepted. This rule which the Court of Appeals District of Columbia unanimously adopted to replace the M'Naghten test and the irresistible impulse test for mental responsibility was: "It is simply that an accused is not criminally responsible if his unlawful act was the product of mental disease or mental defect."<sup>5</sup> The court correctly indicated that the fundamental objection to the right/wrong test was not that criminal irresponsibility was made to rest upon an inadequate invalid or indeterminable symptom or manifestation, but that it is made to rest upon any particular symptom.

In attempting to define insanity in terms of a symptom the courts have assumed an impossible role not merely one for which they have no special competence. In this field of law as in others the fact finder should be free to consider all information advanced by relevant scientific disciplines.<sup>6</sup>

In two cases *United States versus Smith*<sup>7</sup> and *United States versus Kunak*<sup>8</sup> the judges, in particular Judge Paul W. Brosman and Judge George W. Latimer did refer to this new rule, but





time of the offense " He had considered the accused " an anxiety neurosis but as the picture began to unfold, it is a long standing pattern and continual struggle with these various episodes and the final diagnosis, as I recall, was emotional instability reaction with barbiturate addiction "

Since the diagnosis of emotional instability is a character disorder and not a recognized military mental disorder, the defense of irresistible impulse was not allowed

Following her conviction Mrs Smith was examined by expert civilian consultants one in psychiatry and one in clinical psychology They were Dr Alexander Simon and Dr Douglas M Kelley These consultants concluded that at the time of the offense the accused was not able to distinguish right from wrong or to adhere to the right. This led Chief Judge Quinn, who presided in the case, to state

The medical officers who have examined Mrs Smith and whose names will be signed to these findings function in a somewhat differently structured medico-legal context than their civilian colleagues who have also examined the accused By this it is inferred that as to what findings he may make by the established body of medico-legal policy and precedent now codified in part in TM 8-240 It is the impression of the undersigned that in a civilian jurisdiction a much more liberal interpretation of issues of mental responsibility in crimes of violence is frequently observed These statements are made in an attempt to explain some of the differences of opinion as to the accused's responsibility expressed by military and civilian psychiatrists

In the case of the United States versus Kunak the defense was entirely that of insanity Kunak was charged with the murder of 2nd Lt Harold B Williamson He had been seen approaching the table where Lt Williamson was seated He then executed a right face, lifted a carbine and shot Lt Williamson Previous history revealed that Kunak had a half brother and a sister in mental institutions As a civilian Kunak had jumped from a 75 foot bridge, and on occasion had attempted to balance himself on his head while riding a motorcycle at a high rate of speed

There were at least two military sanity boards, one before and one after trial They both found the defendant sane at the time of the alleged offense The second sanity board was held at Fitzsimons Army Hospital in Denver, Colorado The findings of this board were to the effect that while " the accused was suffering from emotional instability, he was sane at the time the offense was committed, at the time of trial, and at the time he

was examined.<sup>22</sup> The conviction was upheld, but before the case went to the Court of Military Appeals the parties entered into a stipulation that further action should be suspended in order that Dr Manfred S. Guttmacher be allowed to examine the accused. His report as reported in the Court of Military Appeals' decision,<sup>23</sup> was as follows:

In this Examiner's opinion the patient is a paranoid schizophrenic. It is his definite opinion that this patient was not a legally responsible agent at the time of his offense and that he is insane now. It is his belief that the patient was suffering from a psychotic irresistible impulse at the time of the crime and that he did not have a full appreciation of the wrongfulness of his acts.

In reviewing this whole situation longitudinally, it seems difficult to understand how a psychiatrist could come to any other conclusion in this case. He does not impress the Examiner as one of those borderline psychotics but rather as a flagrant one.<sup>24</sup>

In this case the restrictive effect of TM 8-240 were also discussed, although it was more definitely criticized in the Covert case.<sup>25</sup> In the Funk case Judge Quinn noted that this type of technical manual "circumscribes the testimonial freedom" of the military expert witnesses.

In *United States versus Dunnahoo*,<sup>26</sup> the problem of character disorders as related to the capacity to premeditate was a prominent issue. The charge was homicide. Dunnahoo, a soldier stationed in Germany, had spent the greater part of one July afternoon in 1954 "in guesthouses near the Schlossheim Forest, Munich, Germany, where he reputedly consumed several beers. Sometime during that afternoon he entered the Forest and his asserted reason was that he intended to locate a prostitute. However, before finding a woman, he changed his mind and decided to return to the city. It was on his return journey that he first saw the decedent," a German national who lived with his parents in the immediate vicinity. After pausing to talk briefly with the boy, the accused continued on his way, "but observed that the boy followed." Then, according to the accused, the boy "started grinning like he was making fun of me or something." This angered the accused, and he struck the boy, knocking him to the ground. "The boy tried to escape but was again caught. The accused later explained, 'I might as well hit him a couple of more times. I would get just as much punishment as if I only hit him once.' At this point and without reason or excuse the accused killed the boy by means of a pocket knife" and mutilated the body.<sup>27</sup>

When apprehended, the accused signed two pre-trial statements. "The first statement indicated that he had killed the

victim under the delusion that the object he was stabbing was, in fact a bear and that the body was mutilated in an attempt to prevent the meat from acquiring a rank' or odorous taste."

Dunnahoo was diagnosed as a character and behavior disorder—in particular aggressive reaction. He was tried and found guilty and sentenced to death. When the case was argued before the Court of Military Appeals the defense maintained that although the accused was legally sane, a character disorder should be considered as to the capacity of the accused to premeditate in regard to his alleged offense, and that in this case it had not been considered. The court agreed with him.

From the psychiatric point of view this was important because it meant that now the courts would have to enlarge their inquiry in cases of this type from just the old "able to distinguish right from wrong" rule (M'Naghten rule) to an inquiry into the patient's mental status at the time the act was committed. As the court noted

We know of no good reason why military law should not embrace principles which keep the courts martial abreast of medical science particularly when the military medical service advances compelling reasons for their adoption. Certainly the state of mind with which a person commits a criminal act is material in determining whether he should be punished therefor and if so how severely."

The court continued

Expert witnesses are seldom asked to express an opinion except on legal insanity and we believe the cavalier treatment accorded the subject of diminution of capacity which we find in many records is not in keeping with the consideration given to the subject of insanity by the military services. We conclude that character disorders as defined in the military medical manuals and regulations should be considered in measuring a person's mental ability to premeditate."

In the final case to be presented United States versus Covert<sup>14</sup> a number of different points were emphasized, all tending to free the psychiatrist from restrictive regulations. The accused had killed her husband an acknowledged drunkard. He had been in frequent financial trouble and had spent most of his wife's accumulated savings of more than \$5,000.00 before re-entering military service in 1946.

They were stationed in England when the wife received word that she was about to inherit a sizable sum of money. She wanted to save it but her husband wanted to buy a car and tour the continent. She thought that her husband was more and more like her father who had been resentful of the fact that she had not been

a boy and who had gone so far as to try to get out of a window on one occasion and on another to climb her

Mrs. Covert became depressed and sought medical attention at the Air Force Hospital. She was seen by a psychiatrist. He was impressed by her agitation and depression and considered immediate hospitalization but decided against it at that time in view of the limited medical facilities and what he deemed the absence of urgency. He gave her another appointment to return the next day.

The accused returned home and was described by a neighbor as being in good spirits. She did not have any arguments with her husband that evening but after he retired she killed him while he slept with an ax. Later she could not offer any reason for the act. She removed her flannel pajamas which, being covered with blood, she placed in a washtub. She then covered her dead husband, took a heavy dose of drugs, and went to sleep in the same bed with the body of her husband.

The next day she appeared for her 2 p.m. appointment with the psychiatrist. He asked about the state of her health and she commented that it was "not so good." Then with no sort of preface she stated in an unemotional and dull monotone "I killed Eddie last night."

The psychiatrist considered that she had been psychotically depressed and was not sane at the time of the alleged offense. Further, she had told him (she was an unreconstructed Southerner) that even the presence of General Sherman would not have prevented her from killing her spouse. Three other psychiatrists who examined her believed that she was seriously ill, but sane.

Mrs. Covert was convicted. After the trial two of the psychiatrists submitted voluntary statements to the effect that they had believed they were bound by provisions of TM 8-240, which restricted their professional opinions. When the defense argued the case before the Court of Military Appeals it was pointed out that the psychiatrists had too literally applied the "police man at the elbow test"\* when the question of irresistible impulse had been raised. The Court of Military Appeals agreed that this had in effect been the case. They reversed the conviction and ordered a new trial.

Chief Judge Quinn stated:

In the *Smith* case, I noted that the military medical experts were obviously testifying to what they believed the service manuals required "to the exclusion of their individual beliefs." This case confirms my

fear that use of the technical manuals on psychiatry are depriving the accused of the right to unbiased and truly professional opinions from military psychiatrists

I am glad Judge Brosman has recognized the improper influence of the technical manual in this case and I concur with him in setting aside the conviction and ordering a rehearing. At the same time I cannot refrain from expressing regret that he has not joined me in a general condemnation of the present use of the service manuals as a restrictive influence on the testimonial freedom of the service doctors.

In summary what has been the over-all effect of these cases in military law and why are they so important to the service psychiatrist? It is my opinion that the psychiatrist has been freed from restrictive regulations and has been given the freedom to testify freely and fully and in his own dynamic language as to his findings. Furthermore, it behooves the military courts to listen to his findings if they are to function properly and intelligently as the judges on the Court of Military Appeals have stated over and over again. Meaningful psychiatry can now enter the military courtroom.

# REFERENCES

- 1 Zilboorg G. *The Psychiatry of the Criminal Act and Punishment*. Isaac Ray Award book. H. court, Brace & Co. Inc. New York N. Y. 1954.
- 2 Osholsky W. *The Psychiatrist and the Law*. Isaac Ray Award book. H. court, Brace & Co. Inc. New York N. Y. 1953.
- 3 Biggs J. Jr. *The Guilty Mind, Psychiatry and the Law of Homicide*. Isaac Ray Award book. H. court, Brace & Co. Inc. New York N. Y. 1955.
- 4 Whipple H. *The Uge to Punish*. Isaac Ray Award Book. F. it. r. Struss & Cud by Inc. New York N. Y. 1956.
- 5 *Manual for Courts-Martial United States* 1951.
- 6 *Durham v. United States* U. S. Court of Appeals D. C. 214 F. 2d 662 (1959)—Decided July 1 1954.
- 7 *United States vs. Smith* 5 U. S. Court of Military Appeals 314 17 Court-Martial Reports 314.
- 8 *United States vs. Kunik* 5 U. S. Court of Military Appeals 346 17 Court-Martial Reports 346.
- 9 *Psychiatry in Military Law*. Department of the Army Technical Manual TM 8-21 and Air Force Manual AFM 160-42 1953.
- 10 *United States vs. Dunnahoo* 6 U. S. Court of Military Appeals 745 21 Court-Martial Reports 67.
- 11 *United States vs. Corvett* 6 U. S. Court of Military Appeals 48 19 Court-Martial Report 174.

# A TECHNIC FOR MILITARY DELINQUENCY MANAGEMENT

## II Methods and Results\*

BRUCE L. BLSHARD *Lieutenant Colonel MC USA*  
ARNOLD W. DAHLGREN *Major MPC USAR*

THE WORKING OUT and establishment of a program designed to avert difficulties previously encountered in a post stockade and in prisons at large and to retain control of the situation in the hands of the administration requires mutual respect, understanding, support, and co operation from the post commander and his staff, the confinement officer and his staff, and the psychiatrist and his staff.<sup>1</sup> Without this, no such program could be successful. The program described appears to involve the following factors:

### COMMAND RESPONSIBILITIES

When the Rehabilitation Company was first established, nearly 1 of its members promptly went AWOL (absent without leave). This was blamed upon faulty screening techniques, but whatever the reason, the AWOL rate of this group (the mass of whom are confined because of AWOL) has, since that time, been generally lower than that of the post at large. Periods of many months have passed without an AWOL. A three day home parole has been given both Christmases and only one prisoner has violated it. A program like this requires, then, one undeniable consideration. The command must be interested enough to tolerate some early growing pains and must recognize that such incidents are only outstanding examples of the renowned tendency of prisoners to test the limits—to see how far they can go. Everyone must be willing to take a chance and to recognize that some problem will arise. To operate the stockade in such a way as to avoid problems decreases opportunities for rehabilitation.

The program described here could not possibly have succeeded without the wholehearted and willing acceptance of the post commander, who encouraged its originators. All the levels of command and the staff sections involved were able to recognize that results could not be a great deal worse than they once were. Thus

\*From Professional Division, Office of The Surgeon General, Department of the Army, Washington, D. C. and Fort Dix, N. J.

Part I was published in November 1957 issue of this Journal.

they have been willing to assume the necessary degree of responsibility to allow their psychiatrist and their confinement officer to exercise their best judgment in the interest of improvement \* Such trust and support frequently paid off only in the long run and like the early AWOL incident, did poorly on a short time basis

Additionally the commander must be willing to listen seriously to the psychiatrist's recommendations for elimination of an individual from the service He must differentiate between the practical possibility of training an individual and his responsibility to do so He must be able to assume that the recommendations of the psychiatrist and of the confinement officer are mature and valuable recognizing that these are the only members of his command who have been able to talk to and observe this individual well enough to have a real and objective basis for arriving at any conclusion whatever

### RESPONSIBILITIES OF THE STOCKADE

The custodial personnel must exercise mature judgment and practice penology at its highest level They must attempt to suppress their tendency to become angry with the prisoners Frequently they must defend their program to others who do not recognize its value Particularly they must be mature enough to avert the reported efforts of persons who for lack of understanding wish to "put some real punishment into that place " Efforts to secure the labor of prisoners to clear the streets to rake leaves or to do more than their fair share of the post's menial tasks must be critically examined The confinement officer must be aware of and prepared to defend the bases for denying such efforts at any time the major and overriding aims of the program might thus be sacrificed Many critics will remember a day when prisoners were used in a variety of very convenient ways These memories however are also of a day when the social pressures upon the military establishment were quite different from those of the present and when the average soldier was differently motivated than is today's soldier

The confinement officer must recognize that essential to his behavior is the championing of the nondelinquent patterns of the prisoner He is not only the prisoner's custodian he is also his spokesman The prisoner must be aware of this continuously if the custodial personnel are to retain control To the degree one can the confinement officer must protect his charges from loss of dignity and individuality while demanding discipline He will get the latter if he gives the former Prisoners will tell one for

---

This program was initiated and supported when Major General John W. Harmony commanded C I I Edward P. Thomas III was Chief of Staff, Col. Richard Cameron MC was Post Psychiatrist, Lieutenant Colonel Al B. Welsh MPC was Provost Marshal, and Colonel Edward L. Ramsey III was Chief of the Confinement Office

example that they are at their most undisciplined and most defiant when waiting about the post under guard. Securing transportation for a bus to transport them may lead to a great deal of rehabilitation than hours of lecture or prison "understanding."

The stockade officer must be the kind of person in whom the prisoner can confide. He will get his best ideas from prisoners and he must give of his maturity in return. This can be demonstrated in a compassionate and understanding attitude toward the prisoner's problem or in more or less concrete ways. The prisoner is frightened when he leaves the stockade whatever the destination. A few words of advice or encouragement may be of crucial value at such a time. The confinement officer must recognize, for example, that a soldier returning to duty after months of confinement, the average soldier needs to have some free time. Arrangements to have the commander of the new unit talk to the prisoner and encouraging that officer to give the ex-prisoner an immediate pass are valuable techniques. Some ex-prisoners will not return from such a pass but a good many more will go AWOL if no pass is given. Only the confinement officer is likely to have the experience to realize this.

Finally, the stockade officer must enter into a co-operative relationship with the psychiatrist. It is most important that he recognize that he and the psychiatrist have different areas of responsibility and that the psychiatrist, too, can be wrong. When a problem that appears to have psychiatric implications arises, it is essential that the confinement officer and the psychiatrist develop a mutually agreed-to procedure and the confinement officer must carry out his portion willingly. If it is decided that a given suicidal gesture, for example, would be best handled by ignoring it, he must be willing to do so. Although the psychiatrist functions only as his advisor, the confinement officer must recognize that psychiatric findings and recommendations are technical suggestions that are perhaps best judged by a trial. Restraint in classifying a matter as a medical rather than a custodial problem is of importance. Declaring a problem to be an emergency must be done conservatively and must be on reasonable grounds. The question is not, for example, just that a given prisoner is having a temper tantrum but rather whether such a tantrum appears to be unusual. The doctor may have less skill in handling a simply angry man than does an experienced guard.

In general the confinement officer must look upon his work as that of custody, classification, rehabilitation, and disposition of prisoners. The maturity to obtain the co-operation of command and the willingness to work co-operatively with the psychiatrist are essential in the program described.



## RESPONSIBILITIES OF THE MENTAL HYGIENE SERVICE

This service must recognize that a substantial amount of its responsibility lies within the stockade. It must accept the pre-suppositions upon which stockades are operated and attempt to accomplish its end within that framework. Doing the actual work within the stockade is not only easier and more economical administratively, but it places the Mental Hygiene Consultation Service (MHCS) staff in the position of an insider in immediate and operating contact with stockade problems rather than remaining an esoteric, overcritical outside agency.

It must be kept clearly in mind that the delinquent is a special type of personality. In most of his work, the psychiatrist is able to place high reliance upon the spoken word of his patients. This is not true with the prison group, and unless he keeps this in mind he will find himself the victim of the prisoners rather than their therapist. He must guard against any tendency he has to become the champion of individuals, to expect guards to behave very differently or to look upon the behavior encountered as a legitimate response to forces within the military about which perhaps he or an individual has problems. Such reactions can only lead to his being victimized and to his opinion being rejected as unreasonable. He is dealing with psychological forces and phenomena far more fundamental than those of the middle class group with which he is accustomed to deal, and he must learn to talk the language. Prisoners are quick to recognize assumed tolerance, overinterest or fake attitudes, but they are more likely to understand if they are spoken to in their own idiom. They are not the average psychotherapy case.

The Mental Hygiene Consultation Service staff must also recognize that a prison is a place in which society imposes control upon persons who will not or cannot control themselves. Regardless of psychiatric opinions, a degree of punishment continues to be a part of the system. This leads to anxiety, depression, rebelliousness and recalcitrance among many of the prisoners and these are the natural consequences of imprisonment. The psychiatrist can rarely do much about it except to exert himself toward helping the prisoner avoid future repetition. He must also recognize that early experiences in a stockade are certain to give rise to adaptational anxiety which will, in time, be resolved. He must be aware of the normal cause of such anxiety in order to know what to expect, lest his overconcern lead him to imply that he can do more to manipulate the prisoner's situation than lies within his purview. He must differentiate between his entirely theoretical notions about delinquency and the contributions he can realistically make within the structure of the system as it exists. If he wishes to initiate changes in the system, there

may be possibilities to do so in his position as a staff officer but at any given moment he must operate within the limits of the realistically available. If he becomes too academic or unrealistically theoretical, he may be of no value to anyone.

It is necessary that he recognize that his recommendations must be based upon considerations other than his own prejudices or caprices. If he recommends separation of an individual, the commander must be provided with information upon which the action could, in each case, be justified to reviewing authorities. His unsupported opinion may be of interest, but it is not a basis for action. Although his primary duty is toward his patient, it sometimes happens that the needs of the Army and of the individual are so at odds that, if they cannot be resolved by changing the the patient, the only practicable answer is discharge. The psychiatrist must be guided by the principle that a person who can not be relied upon to do his share of the work is of no value to the Army as an employee, the social or psychiatric needs of the individual notwithstanding.

He must categorize his function carefully, remembering that certain opinions he has are based not on special skills he has as a psychiatrist but rather upon his common sense as an adult. Such items are not within the limits of his expertise. For example, he should not allow compassionate considerations to influence his psychiatric recommendations. Although he may feel that a prisoner's statement that he must be home with his ill mother is reasonable, this is not a psychiatric consideration. As a psychiatrist, he should only note the statement and attempt to show the prisoner that AWOL is a short-term and not particularly effective way of helping one's mother. The decision about what action is to be taken must be left to the commander. Although it is within his purview and perhaps responsibility to bring the matter to the attention of command, there are administrative policies and techniques for handling such matters and they do not require medical interference. To allow one's humanitarianism to contaminate one's staff relationships can only lead to casting doubt upon the more purely professional functions that do legitimately belong to a psychiatric facility.

The psychiatrist must co-operate with and respect the custodial staff. His visits to the stockade must be at frequent enough intervals so that the normal prisoner is handled in a routine manner. This policy should avert the mass of emergency referrals. On the other hand, if the stockade officer believes that a problem is an emergency, the psychiatrist must be available to see the prisoner immediately. The physician will be surprised, if he utilizes this principle, to discover that more frequently than not an experienced guard is correct if he calls a prisoner psychotic. If the psychiatrist cannot be depended upon, the custodial person

nel will have to "cover themselves" by more liberal declaration of states of emergency. He must recognize that although he gives orders in a hospital he makes suggestions under these circumstances. Sometimes because of factors beyond his knowledge and control these suggestions cannot be honored. Nevertheless, he must work co-operatively with the confinement officer and must attempt to arrive at mutually satisfactory methods of operation.

A smoothly functioning routine is an essential to this program. It may more effectively than any other influence make it evident that this anxiety, that reality need or this depression are expectable and ponderable. A variety of techniques will be used to attempt to get around the routine. If at all possible these should be discouraged. The prisoner who appears without an appointment, the prisoner referred by the dispensary physician, the prisoner who makes a request to see a particular person at MICS are all suspect. In the main such a person is seeking a special handling one cannot really give him. These individuals should be turned away and required to follow the usual procedure. This is of course possible only if they would be seen in the normal course of events.

The major area in which the routine can be defeated is sick call. Physicians will persist in wishing to treat the normal anxiety of the prison population. Consequently, the dispensary physician should be encouraged to send such patients away with instructions to await their normal and routine interview. If the liaison with the custodial staff is proper that staff should not have to send prisoners to sick call for purely psychiatric reasons. In his search for special handling, however, the prisoner will quickly sense and exploit a way to circumvent the system frequently as part of an effort to defeat the administration.

In practical fact the mass of the work done in the program is done by social workers. They interview all new prisoners after trial and make an effort to interpret the prisoner's behavior to him. Reality problems such as concern for family, allotments and other such matters are also gone into. The interview is brief, but in it the social worker attempts to get the prisoner to examine his own behavior and search for its causes. He also indicates interest and acceptance. The most important function of the interview, however, is to lay the groundwork for the remainder of the program. This interchange between prisoner and social worker provides an experience in which acceptance is offered and an opportunity for coming to terms with the administration is provided. The prisoner's conforming attitudes and behaviors are emphasized. The prisoner is shown that lack of social conformity has been of little value to him but the essence is that such antisocial attitudes are in this interview as they are in other contacts with the administration simply not the basis on which transactions are allowed.

to take place. The social worker may see a prisoner a second or third time but, in any event, he does not recommend appearance before the Classification Board until there is a marked evidence of change in attitude. A similar change must occur before clemency is recommended. If there is no change, the social worker may make no recommendation whatever.

When and if a person has had three courts martial or if he is a psychotic, a homosexual, an alcoholic, or a drug addict, he is referred on to a psychiatrist. The psychiatrist hospitalizes the psychotic, who then becomes a medical disposition problem. The psychiatrist recommends all others for appearance before a board of officers convened under the provisions of appropriate regulations,<sup>11,12</sup> and makes findings and recommendations for use by that board. In custodial problem cases, he recommends that early action be taken, but allows all others to complete their sentence without interference.

The social worker also sits as a member of both the Classification Board and the Clemency Board. Beyond this, the MHCS staff performs only those services at the stockade that are requested, attempting not to interfere with its routine. Although the stark and unhappy stories told to the social worker are frequently fabrications, great care is taken to assure that the individuals doing this work do not become cynical. Any reasonably believable story is checked by requesting a home conditions report from the American Red Cross. Such information is not only of value to the psychiatric staff, but also may be helpful to the commander in arriving at administrative decisions.

Finally, the MHCS must recognize that although much that goes on pertains to psychiatric considerations, it by no means follows that the MHCS always has a contribution to make, to say nothing of a solution to offer. When this becomes evident, such contributions as may be appropriate are made, and the staff carefully withdraws from the situation. While no one proposes that modern systems of justice are perfect, psychiatry has not yet reached the point of having a really better answer to some problems.

### TECHNIC OF OPERATION

Twice weekly, the confinement officer prepares a list of the newly sentenced prisoners in the stockade. This is forwarded to the MHCS through the appropriate personnel section which adds essential data such as the number of courts martial, the commander's opinion, or cetera. A social work officer has two periods of consultation a week at the stockade during which he sees every person so listed. He investigates the background of the case, discusses it with the commanding officers where indicated, and makes a report to the stockade commander. Individuals referred on to the psychiatrist are seen routinely the following week during

one of two regularly scheduled periods for psychiatric consultation, also held at the stockade. There is liberal, informal consultation with the confinement officer and the decisions arrived at, although a part of the psychiatrist's report, are usually the concurring opinion of the psychiatrist and the confinement officer. During these periods, the psychiatrist also examines any person or group referred by custodial personnel, does pretrial sanity determinations on the request of The Judge Advocate General (the number of persons being tried is such that routine pretrial evaluation is impossible) and sees persons referred by the dispensary, The Inspector General or the Special Inquiries Section of The Adjutant General.

In situations in which the recommendation is for clemency, transfer to the rehabilitation company, or special work assignments and limitations, or when it is upon other matters that constitute recommendations to the confinement officer the final report is provided to the confinement officer and is used by the various boards. The confinement officer and the psychiatrist work together particularly closely in arriving at techniques for handling persons given to hysterical fainting, paralysis, vomiting and other evidence of individual rejection of or failure to adapt to the confinement situation. Similarly they work out procedural techniques for dealing with cliques, "kangaroo courts" and tantrums of various types.

In cases where elimination from the service is recommended, the report is provided to Post Investigations where it is heard immediately if such is the recommendation, or it is placed in a suspense file to be heard at such a time as to assure that the individual will not return to an active duty status. All reviewing agencies expedite their handling in order not to impede the orderly flow of the process. Table 1 provides data concerning the characteristics of a sample of 500 cases seen by the MUCS at Fort Dix. N J.

### EFFECT OF THE PROGRAM

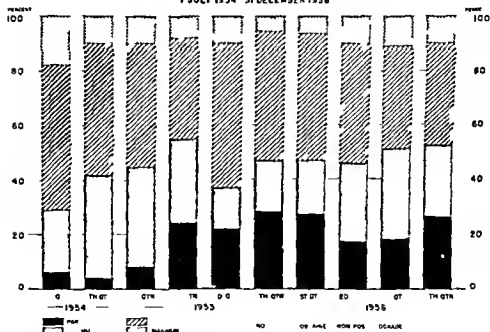
*Criteria of efficacy in any rehabilitative procedure are difficult to establish.* In the case of the rehabilitation of delinquents, the problem is made to appear even more bleak by the modesty of results under the best of circumstances. There are, however, indexes available for the evaluation of an over all stockade operation and such data are presented here. It is impossible to establish which of these effects can be ascribed to the psychiatric program *per se*. A tendency exists to overevaluate the psychiatric contributions and to underrate the value of custodial staff attitudes, the availability of work programs and staff and command co-operation. There is probably an even more significant tendency to fail to recognize the importance of co operation and mutual respect among these agencies. Although the custodial personnel



the relationship between the custodial personnel and the prisoners is such that work programs will be participated in by the prisoners with sufficient willingness so as to be efficacious.

Figure 1 indicates the proportionate distribution of classes of custody. It is to be noted that before the program was inaugurated nearly 20 per cent of the prisoners were in maximum custody and fewer than 10 per cent were on parolee status. About 70 per cent were in medium or maximum custody, seemingly indicating marked dependence upon area restraint. After the program was put into

AVERAGE QUARTERLY DISTRIBUTION OF CUSTODY GRADES  
(PERCENT OF TOTAL STOCKADE POPULATION)  
1 JULY 1954 31 DECEMBER 1955



operation maximum custody fell as low as 5 per cent and never rose above about 10 per cent. Maximum plus medium custody accounted for 50 per cent or less of the population during most of the reported period. Parolee status was awarded to from 20 to 25 per cent of the population while during most of the period minimum custody plus parolee accounted for about one half of the population. In general the data seem to indicate a substantial diminution in the use of area restraint.

The question arises as to whether this easing of restraint led to an increase in restiveness. Sick call represents one traditional way of expressing dissatisfaction. The sick call rate at a post stockade is usually considerably greater than in the post at large. Figure 2 indicates that starting with a rate more than seven times

that of the post, there has been a general diminution to less than five times the general rate.

COMPARATIVE SICK CALL RATES EXPRESSED AS INCIDENCE PER 1 000 PER ANNUM  
1 OCTOBER 1955-31 DECEMBER 1956

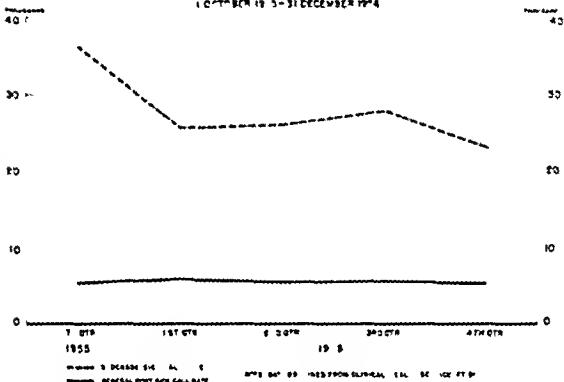


Fig. 1

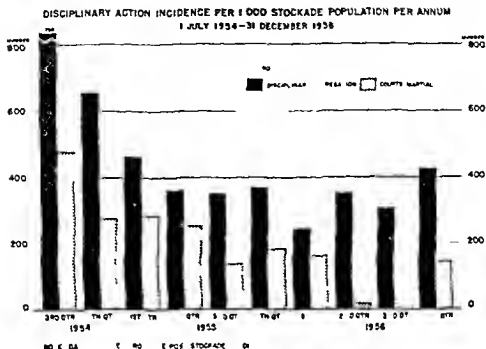
Such restiveness and resistance to the general discipline of the stockade might be expected to manifest itself in an increased number of disciplinary actions within the stockade itself. Figure 3 indicates the marked diminution in the use of both disciplinary segregation and court martial. These measures have been regarded by the custodial personnel as much less necessary.

The incidence of escape from either the stockade proper or the rehabilitation company does not lend itself to graphic representation. In general, however, escape from the post stockade has remained relatively constant in spite of the diminution of "custody grade consciousness." The rate approximates or is lower than the post AWOL rate. The small size of the rehabilitation company is such that one elopement produces a significant value when expressed as a rate per thousand per annum. Since the early incident of almost total elopement, as long as 8 months has elapsed without an escape, and during the remaining period one or two prisoners are the maximum to escape during any quarter. This is in spite of the Christmas home parole policy described.

#### Criteria of Psychiatric Results

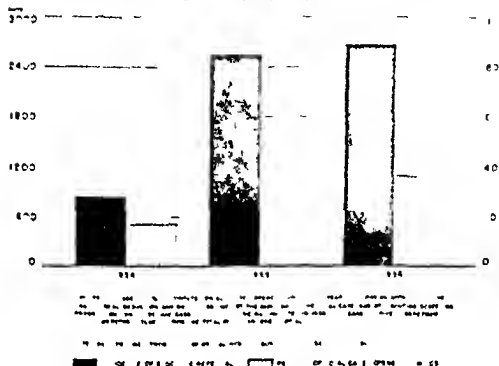
Psychiatric results have been even more difficult to evaluate. Obviously, with a program of this sort, the nonpsychiatric incidence rate, if measured by the number of cases reported, approach



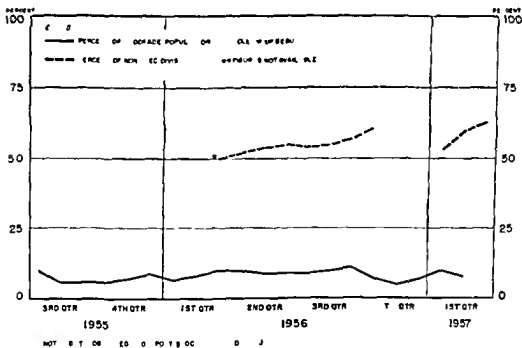


es 100 per cent. The referral rate has never actually reached 100 per cent, however. This is because individuals awaiting appearance before a general court martial are seen only on the request of the Office of the Judge Advocate General. Also during this period personnel of the overseas replacement pipeline were seen only on specific Command referral. The incidence of referrals to MHCS from the stockade expressed as the rate per 1 000 per annum before and after initiation of this co-ordinated program, is compared in figure 4. The percentage of total MHCS cases opened that were generated in the stockade is also indicated. It can be seen that the number of cases opened has about doubled. It is believed, however, that the amount of time and effort expended on referrals from the stockade has remained about the same. Such a co-ordinated program makes it so much easier to achieve results that more can be done for more people at less expense in time and effort. The types of cases encountered show only the expectable preponderance of antisocial types of character disorder. The incidence of psychosis and of other psychologically determined symptoms is not significantly different than the incidence elsewhere on the post. Transfers to the rehabilitation company have never been made in large numbers. The census of that operation has remained more or less constant at about one tenth of the total population. This is reflected in figure 5. The percentage of these known to be nonrecidivists on a 90 day follow up is reflected in the broken line.

REFERRAL OF STOCKADE FOR OTHER TO MENTAL HYDROE COI LATION & RYIC  
 RATE EXPRESSED AS PER CENTAGE PER 1000 PER ANNUM  
 PERCENTAGE OF TOTAL MMS CAL DERIVED FROM THE STOCKADE  
 1 JAN 1957 2 4 31 6 EM 18 20



CENSUS OF REHABILITATION COMPANY EXPRESSED AS A PERCENTAGE OF THE TOTAL STOCKADE  
 POPULATION PERCENTAGE OF KNOWN NON RECOGNISTS AT NINETY (90) FOLLOWING  
 RESTORATION TO DUTY FROM THE REHABILITATION COMPANY



A study of the results of the rehabilitation program as measured by the reported opinions of the commanding officers of the units to which "graduates" of the program are assigned subsequent to restoration to duty has been conducted. The reports made by these officers in response to a letter sent to them 90 days after restoration are tabulated in Table 2.

TABLE 2

VIEW OF PERFORMANCE OF MEMBERS OF THE REHABILITATION  
GROUPS OF THE STOCKADE TO UNIT PLACES FOR 1957 DATA

(Data were given by the commanders of the companies  
to which individuals leaving program were subsequently  
assigned. 21 of inquiries were returned in reply. The  
percentages given are based upon the replies received.)

October 1956      May 1957

Stockade Recidivism Data - 1956/1957

RECEIVED	1
NOV	1%
DEC	1
JAN	1
FEB	1
TOTAL NEW RECIDIVISTS	2

Stockade Recidivism Data - 1956/1957

NOV 7 STOCKADE	7%
RECEIVED STOCKADE	11
NOV	11%
TOTAL NEW RECIDIVISTS	12%

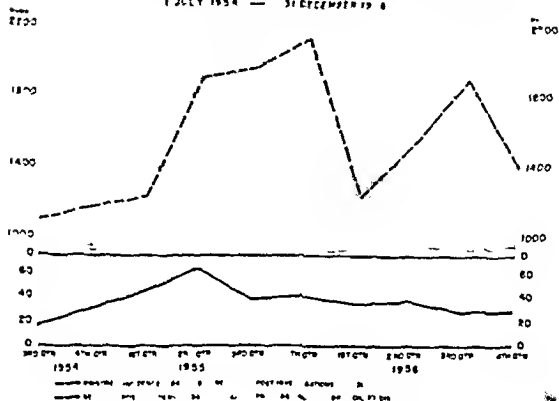
Data obtained from Post records. Post No. 100, 1000

Individuals admitted to stockades invariably have a high administrative discharge rate. The occurrence per quarter expressed as an incidence per 1 000 per annum of this disposition in this group is reflected in figure 6 and compared with the over all post rate. It is to be noted that a sharp early rise tended to level off toward the level which existed prior to the onset of the program.

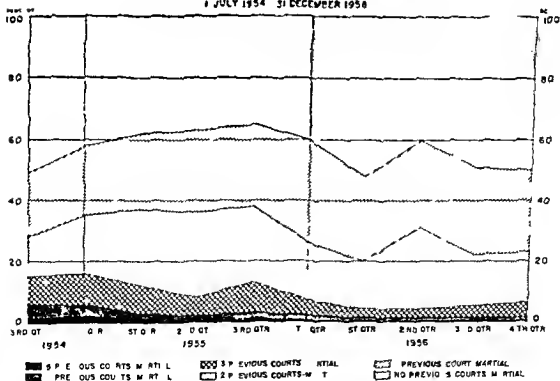
The recidivism rates are reflected in figure 7. Of significance is the disappearance of recidivism beyond 5 times and the near disappearance of recidivism beyond 4 times. Approximately 18 per cent of the population had had 3 or more previous courts martial prior to the onset of the program which figure has dropped to approximately 5 per cent. The incidence of first offenders has not changed significantly.

The number of confined individuals per 1 000 mean post population was greater in this stockade than is typical of posts army wide. To some degree at least this reflects the presence of a substantial number of individuals from other posts apprehended in local areas and confined at Ft. Dix for disposition (table 1). The program described has however been accompanied by a

QUARTERLY RATE OF ADMINISTRATIVE DISBURGES (AREL) BY AR 635 200  
 AR 635 200 AR 635 200 EXPRE EDAS INFLUENCE PER 1000 PER ANNUM  
 1 JULY 1954 — 31 DECEMBER 1958

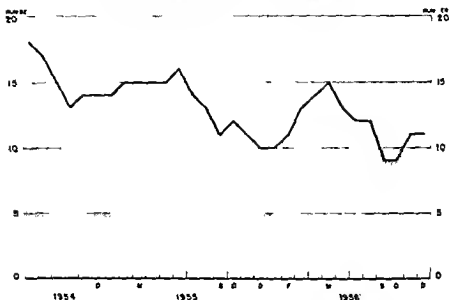


PERCENTAGE OF RECIDIVISM MEASURED BY THE INCIDENCE OF  
 PREVIOUS COURTS MARTIAL IN THE PRISONER POPULATION  
 1 JULY 1954 31 DECEMBER 1958



gradual diminution in the number of prisoners per 1,000 mean post population which now approaches more nearly the average post's experience. This is reflected in figure 8. This incidence has dropped from a high of 18 prisoners per 1,000 troops to about 10 prisoners per 1,000 troops. The establishment of an overseas replacement station in the middle of this period produced no appreciable change in the data.

NUMBER OF PRISONERS PER 1 000 POST POPULATION



### SUMMARY

The social atmosphere of modern America and the pressures presently impinging upon the commander of a post in the U S Army are such that a stockade must be operated in a fashion that will avoid incidents leading to danger to life or limb. In addition, this group contains a high percentage of persons of low military potential whose disposition is economically advantageous once this has been clearly established. A program of mutual co-operation between stockade and psychiatric personnel appears to be an effective device to attain this end. A constructive program for the rehabilitation of those who can be reclaimed is described. This latter appears to avert the confirmation of delinquent behavior as a persistent behavior pattern which leads to an unnecessarily high loss of personnel. The results of this sample program are presented.

### REFERENCE

36. Loo A R. Psychiatry in correctional process. In Hoch P H and Zubin J (editors) *Psychiatry and the Law*. Grune and Stratton Inc. New York N Y 1955 pp 140-141.

# EVALUATION OF A PACKAGED RETENTION ENEMA IN PREPARATION FOR PROCTOSIGMOIDOSCOPY

FRANK E. ABOT Captain USAF (MC)  
LIEUTENANT COLONEL USAF (MC)  
FRANCIS W. SUTHERLAND Captain USAF (MC)

**P**ROCTOSIGMOIDOSCOPY is an essential diagnostic examination for patients with colonic and anorectal disease. More recently it has been used as an integral part of the routine physical examination on all patients over 35 to 40 years of age. In spite of its importance, it has been looked upon by patients, ward personnel, and many physicians with disfavor. This has primarily been due to the problem of obtaining an adequate preparation. Traditionally, patients are prepared with enemas or laxatives, both of which are uncomfortable, aesthetically repellant, and involve the expenditure of considerable time. It is not unusual for the patient to spend at least 10 minutes in an uncomfortable position, most of which time is taken up by the unhappy physician laboriously scrubbing or aspirating feces, in order to obtain a clear view. In many instances the self-prepared patient, having spent many uncomfortable hours, comes for the examination so poorly prepared that he must be rescheduled and attempt the onerous chore all over again. This often has resulted in his deferring the examination, such delay may at times prove to be tragic.

In the course of investigating the incidence of rectal or recto sigmoid polyps in a large group of asymptomatic young airman, we encountered considerable difficulty in obtaining adequate preparations and, frequently, reluctance on the part of the subjects for re-examinations. We therefore decided to investigate the effectiveness of a recently introduced packaged retention enema preparation of sodium biphosphate and sodium phosphate. Our results were so satisfactory that we have adopted it as the routine preparation for proctosigmoidoscopy in our active proctoscopy clinic. This communication is a report of the results of our study.

From U. S. Air Force Hospital, Lackland Air Force Base, Tex. Dr. Abbot is now at 163 Grove St., Waterbury, Conn.

Retention enema containing 16 grams sodium biphosphate and 6 grams sodium phosphate in each 100 ml. supplied by the C. B. Fleet Co., Inc., Lynchburg, Va.

## MATERIAL AND METHODS

Subjects for this study were 333 asymptomatic young nirmen being investigated for incidence of polyps, 50 foreign language students examined for enteric parasites, and 283 patients referred for a proctosigmoidoscopic examination with gastrointestinal symptoms. No preliminary preparation was made. The majority of the subjects were examined in the first part of the morning for the sake of convenience, but many were examined in the late afternoon on the day of their first visit to the referring clinic or hospital ward.

With the subject in the knee chest or left lateral position, the entire contents (133 ml) of the plastic "squeeze bottle" was introduced into the rectum. The subject was instructed to retain the enema as long as he was able and then to remain on the commode until he felt his bowel had moved completely. Proctosigmoidoscopy was done at varying time intervals following the enema. The following data was recorded: (1) Time enema was retained; (2) time between enema and examination; and (3) the presence and type of symptoms produced by the enema.

At examination the adequacy of the preparation was graded as excellent if the rectum and rectosigmoid were completely clear of feces; good if the small amount of liquid or solid feces present was easily removed; poor if a large amount of feces necessitating much swabbing or suction was encountered. When preparation was so poor as to prevent or limit the examination, a second enema was given. The degree of hyperemia, spasm, and mucus present was graded by the method of Almy and Tulin.<sup>4</sup> In a certain number of patients, swab specimens of rectal contents were examined microscopically for ova and parasites. In another group stool specimens obtained both spontaneously and from enema results in addition to rectal swabs were examined.

## DISCUSSION

Preparations were excellent in 526 subjects (78.5 per cent), good in 120 (18.5 per cent), poor in 20 (3 per cent). Of the latter 7 (1 per cent) had to have repeat enemas, all of which resulted in excellent preparations. The average time the enemas were retained was 5 minutes, ranging from 1 to 12 minutes. The average interval from enema to examination was 28 minutes, with extremes of 4 and 90 minutes. There was no correlation between either the retention time or the interval until examination and the quality of the preparation. Thirty-seven subjects (5.5 per cent) complained of mild cramps resulting from the enema. The majority simply experienced a compelling urge to defecate. Two hundred and five subjects (31 per cent) were found to have increased amounts of mucus (the great majority 2 plus), 175 (27 per cent)

had hyperemia of the colonic mucosa (mostly 2 plus), and 65 (12 per cent) were found to have spasm 2 plus being the majority degree. There was no correlation between the time of retention or interval of examination, and the presence or degree of these findings. They were usually found alone, and only very seldom were associated with others. Spasm and hyperemia were associated more often than the other changes. The more than two thirds with no change showed a widely patent rectum and rectosigmoid of healthy appearance into which the proctosigmoidoscope was introduced with ease and a minimum of discomfort. The average distance examined in all subjects was 5.7 inches. There was no correlation between this and the quality of preparation.

Two hundred and twenty of these subjects had rectal smears smeared examined for ova and parasites. Twelve of these were positive for parasitic ova and cysts. Five were characterized as having excellent preparation, seven were good. Fifty language students, mainly Asiatics, had rectal smears examined microscopically following the enema, and also spontaneously passed stool specimens examined by concentration technic. Three of the smears were positive, 29 of the stool specimens were positive for parasites. All of the preparations were characterized as excellent. In addition, the stools of 70 subjects obtained as returns from the enema were subjected to examination by concentration technic, 16 of which were positive for parasites. Also, 3 Puerto Rican patients had mucosal biopsies, positive for viable *Schistosoma* ova.

### CONCLUSIONS

No comparative figures on the quality of preparation in patients prepared traditionally for a proctosigmoidoscopy are available. Three hundred consecutive records of our routine proctosigmoidoscopies were studied with this in mind, but insufficient characterization of preparation was noted. There is no doubt in the minds of those of us who have experienced both methods, however, that the majority of preparations by the enema described are infinitely superior to those by traditional methods. The field is completely clear almost 80 per cent of the time, and with the lack of spasm reported here in 88 per cent, the instrument may be introduced rapidly and relatively comfortably. The lack of prior preparation and the consequent availability of the examination at any time of the day encourages the use of this procedure and speeds diagnosis of anorectal conditions. Ease and lack of

Positive smears showed *Entamoeba coli* cysts, ascaris ova, *Trichomonas hominis* protozoa, and *Iodamoeba* cysts. Stool examinations by concentration technic showed ascaris ova, hookworm ova, *Strongyloides* larvae, *Trichostrongylus orientalis*, *Clonorchis sinensis*, *T. hominis*, *Giardia lamblia*, chilomastix, *Entamoeba histolytica*, *Iodamoeba bütschlii*, *Endolimax nana*, and pinworm ova.



discomfort during preparation encourages patient co-operation. This preparation also provides for better detection of small lesions and biopsy may be accomplished readily. The average distance examined in 300 patients prepared traditionally was 8.6 inches compared with 8.7 inches in our subjects.

Our results show that adequate rectal smears for parasitic trophozoites, ova, and cysts should not be expected from this preparation. The majority of our positive smears were from inadequate preparations. It may be inferred from the large number of positive stool examinations with negative rectal smears in preparations found to be excellent, that this method of preparation is too thorough. On the other hand reliable fresh stool specimens may be obtained by the retention enema. It is an excellent preparation for mucosal biopsies for *Schistosoma ova*.

The mechanism of action of the Fleet enema is not known. Of interest in this regard are two patients not included in this series. Both had saddle anesthesia with cord bladder—one from metastatic carcinoma of the breast to the sacrum, the other from trauma to the cord. Both were given the packaged enema for fecal impactions. Neither had an urge to defecate, nor did fecal returns result. It may be inferred that the enema initiates a local rectal reflex for defecation.

### SUMMARY

Of 666 patients given Fleet enemas as preparation for a proctosigmoidoscopy 78.5 per cent had excellent preparations, 18.5 per cent, good, and 3 per cent poor. This preparation may be given quickly, without prior preparation anytime of the day. It causes little discomfort. This method is recommended to replace other traditional preparations for proctosigmoidoscopy.

### REFERENCES

1. Hinch E W, Bie L A, Barges J A, and Smith L A. Adom of rectum and sigmoid colon : cid ce a rev led by proctosigmoidoscopic xamin tie of gro p of p tie ts fre of complaint referable to colon a d rectum. *Gastroenterology* 16:669-673 Dec 1950.
2. Sw ton N W. Polyps of rectum and colon. *J A. M. A.* 134:658-662 Feb 20 1954.
3. Abbor F K, Muro L S, and Spencer F M. Incide ce f p lyps in 500 procto igm ido c pi s io asympt matic young m. *Gastroenterology* 32:704-707 Apr 1957.
4. Almy T P, od Tulin M. Alt r ti ns in coln ic f ctu ns in man oder stress e p rimental prod ctio of ch ages simulating rit ble col. *Gastroenterology* 8:616-627 May 1947.

# CONGENITAL DERMAL SINUS AND CYST

RECEIVED 1 OCT 1941  
HUGHES 1 - 113  
LATERAL 1 1113 11 1113

**N**O SUBJECT in the field of congenital pathology is more confusing than the nomenclature and classification of the "congenital tumors". The clinical life span of intracranial and spinal "dermoids" is especially ambiguous from the viewpoint of pathology.

The relative infrequency of congenital tumors has led in many instances to the presentation of lesions of widely varying microscopic appearance as a single group. Thus, from the anatomical standpoint, intracranial "dermoids" often have been grouped with the teratomas, and by inference have been classified as true neoplasms. This grouping would appear to be incorrect pathologically and might lead to errors in clinical management. Illustrative cases will be presented.

## PATHOGENESIS OF TERATOMAS

Sweet<sup>1</sup> collected 156 cases in 1940 and classified them as dermoid, teratoid, and teratomatous intracranial tumors in 12 different groups according to location. He pointed out the great difficulty in classification stating that these tumors consisted "pathologically of a series of gradually increasing complexity, and that any separation of them into subgroups must be at arbitrary points". Sweet further called attention to the fact that Ewing<sup>2</sup> had discarded the idea of metaplasia of nonectodermal structures from the connective tissue elements of the skin (the so called "mixed tumors") in favor of the concept of a natural unfolding of embryonal cell potencies, and that these tumors were now known as teratomas.<sup>3</sup>

Willis<sup>4</sup> gave the literal meaning of teratoma as "a malformation which is also a true tumor" and defined teratoma as a "true neoplasm composed of multiple tissues foreign to the part in which it arises". In discussing the hypotheses of origin of teratomas, he stated that the most popular view is that these growths represent distorted fetuses, derived either from included twins of the

From U. S. Naval Hospital, Chelsea, Mass. Comdr. Crue is now assigned to U. S. Naval Hospital, San Diego, Calif.

bearers or from parthenogenic proliferation of the bearers' own germ cells. Willis thought this was incorrect, however, because the common sites of teratomas are not the sites of parasitic twins. Most teratomas arise during early stages of development when their bearers have no mature germ cells capable of parthenogenesis. Topographic study of teratomas shows that while some times highly organized they are not fetal in form, and the view that they represent embryos ignores the fact that they are true neoplasms with powers of independent growth not seen in "amorphi" or parasitic twins. Instead, teratomas may represent neoplasms in areas of tissue which escaped from the action of the primary organizer during early embryonic development. The site of distribution of teratomas points to the operation of growth disturbances emanating along the primary axis.

### SYNONYMS

Distinct clinical and histologic entities have come to be recognized among the congenital tumors. This has led to different terms such as chordoma of the clivus of the base of the sphenoid, craniopharyngioma or cyst of Rathke's pouch, and teratomas of the pineal region. Confusion has been compounded by the various synonyms used by different authors. Classification according to microscopic determination of the number of germ layers has led to terms such as monodermoma, bidermoma and tridermoma. Classifications according to predominant tissues (ovarian goiter) and the organ where the tumor arose (cholesteatoma of the ovary) have been used. The term "cholesteatoma" may be used to describe the gross appearance of several different entities within the cranial cavity. Degrees of malignancy, on both a clinical and a histologic basis, led to terms such as teratoblastoma, embryoma, teratocarcinoma, and embryonic carcinoma. Even common terms often are misused clinically. For example, the superficial epidermoid is often called a "cyst" or "sebaceous cyst," when in reality it contains only desquamated squamous cells.

If no exact classification could be made the ending "oma" often became changed to "omatous." The suffix "oid" originally meaning "form" from the Greek has come to mean "not quite like, but almost."

Various other terms were described in an article by Black and German<sup>9</sup> and in a review by Sachs and Horrax.<sup>10</sup>

### TRUE NEOPLASMS NOT SEPARATED

In 1946 in an article on cystic teratomas and teratoid tumors of the central nervous system in infancy and childhood, Ingraham and Bailey<sup>11</sup> listed 15 cases: 8 intracranial and 7 intraspinal. This series apparently included 3 "dermoids" of the posterior fossa. These authors stated "Since certain tumors of the central

under discussion but for not a truly different general principle. It has been recognized that certain types of teratoma have been excluded as being ectodermal. We have included the dermoid cysts because they present many general features similar to those of the cystic teratomas and because it is a belief that they are histologically a developmental stage in the formation of the teratoma.

In 1930 Black and Coombs<sup>11</sup> related as a title to congenital tumors with the statement "The epidermoid dermoid teratoma and its anatomical tumors of the central nervous system: a congenital neoplasm" that one of particular original pathological and embryological interest.

Others do not agree that the "dermoid" of the present formula is a neoplasm.

Willis<sup>12</sup> stated in 1951 that a teratoma is a true tumor and, unlike a simple malformation, has powers of progressive growth either in benign or malignant form. Teratomas should be distinguished from non-neoplastic malformations of all kinds, whether relatively simple heterotopias of particular tissues or complex malformations such as double monsters or imperfect twins. Sequestration dermoid cysts of the skin or cranial cavity, branchial cysts, and many other developmentally misplaced and supernumerary parts and tissues (Albrecht's "hamartomas") all constitute masses of multiple kinds of tissue in the wrong places but are not neoplastic and quite unrelated to teratomas.

Dermoid cyst is a frequently used synonym for benign cystic teratoma of the ovary when the dermal elements predominate. If a thorough search is made, tissues other than skin can usually be found. The same name is also applied to intracranial skin-lined cysts. It appears, however, that most intracranial "dermoids" probably are not true neoplasms. To prevent any unwarranted connotation, the term "congenital dermal sinus" or "congenital dermal cyst" would seem preferable.

#### PATHOGENESIS OF CONGENITAL DERMAL SINUSES AND CYSTS

Ingraham and Matson<sup>13</sup> pointed out that since the neuroectoderm separates from the epithelial ectoderm along the dorsum of the embryo, it is natural to expect that persistent epithelial defects may extend to any depth from the deeper layers of the skin to the substance of the central nervous system, and, because this midline fusion begins in the middle of the embryo and proceeds both cranially and caudally, there is chronologically more opportunity

for cutaneous defects to occur in the lumbosacral and suboccipital regions. This correlates clinically with the frequency of occurrence of congenital defects along the midline at these two locations.

This pathogenic mechanism would seem to apply whether the sinus or stalk connection to the surface remains or disappears. If the defect occurs early in embryonic development, with "pinching off" at about the third or fourth week of fetal life, then a simple "epidermoid" might be expected to result. Just when the accident occurs that includes other elements and gives rise to a "dermoid" is not definitely known nor is it known at just what stage "cell rests" occur that later give rise to true neoplasms, the teratomas. Because of their autonomous growth they are usually thought of as embryonic. Also unknown is the mechanism whereby they can remain in situ for years and then in some cases give rise to rapidly growing malignancies. Just where a similar mechanism fits in for the production of meningoceles or aplasias and what brings them about is also still largely a matter of conjecture.

In the sacral area the commonest defect is the dermal sinus. This is not an infrequent finding, even on routine examination, and it is now generally recognized as a congenital defect.<sup>13</sup> It is usually entirely dermal so that the term "pilonidal sinus"<sup>14</sup> is superior to "benign sacral cyst teratoma." Only a small percentage have a residual connection with the spinal canal, and surgical removal of the pilonidal sinus generally is performed only after the lesion causes symptoms, usually from local infection.

There also may be true neoplasms in the sacral area. These congenital tumors may be either benign or malignant, and may be found in infancy or in the adult. Thus congenital defects as well as congenital neoplasms (the true teratomas) may affect the spinal canal at any position along the spinal axis.<sup>15</sup>

If these congenital dermal sinuses of either the anterior or posterior neuropore are not classified with the teratomas but are considered developmental defects they might be expected to occur in relation to other types of developmental anomalies. Even teratomas and lipomas are found not infrequently in association with other central nervous system anomalies.

In the past two years five patients with intracranial dermal cysts have undergone craniotomy at this hospital. In one additional patient this clinical diagnosis was made but operation was not advised. Four of these cases were somewhat unusual and seemed of interest in view of the above discussion of pathogenesis.

### CASE REPORTS

**Case 1** A 4½-month old white boy was admitted to the hospital for elective neurosurgical excision of two occipital masses both present

since birth. The child was a product of normal pregnancy, labor, and delivery. He had been in excellent health except for two episodes of mild otitis media. The head of the infant developed normally and he exhibited no other symptoms of increased intracranial pressure had occurred.

Physical examination was normal except for the occipital lesions (fig 1). The upper mass was 2.5 cm in diameter, smooth, and translucent well. It had a thin wall and was cystic. The fluid contents could be compressed into the cranial cavity easily and a bony defect could be palpated. The lower mass was 3 cm in diameter, did not transilluminate, and was covered with thickened skin and hair. The contents were firmer and could not be displaced.



Figure 1 (case 1) Encephalocele above dermal cyst below Sinus tract is lateral to lower mass.

At operation a previously undetected sinus tract was found after shaving at the lateral edge of the lower mass. A probe could easily be passed through the sinus to the bone but not beyond the skull.

The upper mass was removed first and proved to be a meningocele containing no nervous tissue grossly. The wound was completely sutured then the lower lesion was excised. It proved to be much thicker walled and was filled with sebaceous material and hair. The accompanying sinus tract ended blindly in a stalk that appeared to go through a very small opening in the occipital bone. In view of the lack of neurologic symptoms and the contaminated nature of the external wound the stalk was transected at the level of the outer table and intracranial exploration of the posterior fossa was not carried out.

Postoperatively the patient recovered promptly. He was discharged on the eighth postoperative day.

Pathologic examination verified the operative finding that the upper lesion had a dural lining while the lower one was a typical dermal cyst.

*Comment.* It is believed that this case represents two associated congenital anomalies and that this type of dermal cyst can in no way be considered a neoplasm. As Logue and Tilt<sup>11</sup> have stated, these lesions enlarge only "as a result of the secretion of sebaceous material and the desquamation of epithelium within." That symptoms from an intracranial portion of the dermal abnormality may develop in the future is admittedly a calculated risk.

**Case 2.** A 13 month-old white girl was admitted to the U S Naval Hospital Chelsea Mass because of a lesion of the scalp present since birth. Pregnancy, delivery and postnatal development had been normal. The only physical abnormality consisted of a mass in the midline in the midparietal area. The mass was approximately 3 cm in diameter and was raised about 2 cm with a definite large central dimple. There was a pronounced port wine discoloration of the surrounding skin.

Roentgenograms revealed a small bony defect in the midline slightly anterior to the soft tissue mass and also anterior not only to the lambdoid suture but also to a second suture line formed by a wormian bone (the so-called incaral bone).

It was thought clinically that this was a typical congenital dermal sinus but more anterior than usual. It was not known whether a sinus tract from this midparietal area led to the posterior fossa or ended above the tentorium.

At operation the skin lesion was excised and bone was removed so that the underlying stalk could be followed intracranially. The sinus was found to go through the dura tightly adherent to the left side of the longitudinal sagittal sinus. A dural flap was elevated over the left parietal cortex. A probe was inserted in the sinus and surprisingly a sharp posterior angulation was found. The probe was inserted with ease

to a depth of 4 cm. The air appeared to be between the lateral lesser part of the falx and was visualized downward between the tentorium for a depth of almost 1 cm. when the left parietal cortex was torn at a lateral level. No more was seen. Further exploration along this plane was not considered to be warranted. 1 cc of oil (Lipiodol) and 1 cc of air was injected into the sinus tract, the sinus filled with air and the operation terminated.

Postoperative roentgenogram (fig 2) denotes such an accumulation of dye within the posterior fossa. This was believed to be within a "dermal cyst."

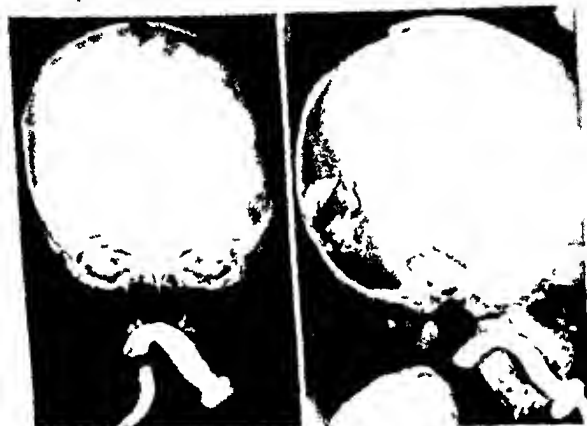
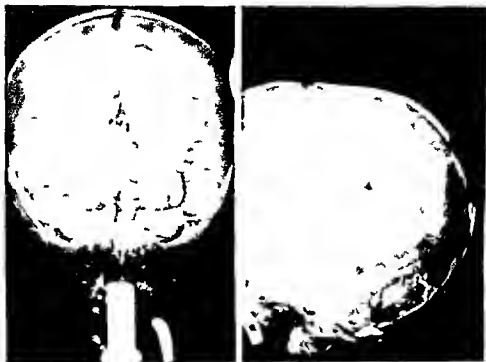


Figure 2 (case 2). Posteroanterior and lateral roentgenograms after injection of Lipiodol into sinus tract.

The patient did well postoperatively. Forty eight hours later roentgenography was repeated and revealed that the Lipiodol was scattered throughout the posterior fossa with an accumulation pooled inferiorly apparently in contact with the occipital bone. A roentgenogram of the lumbar spine showed dye in the lumbar spinal canal. A pneumoencephalogram was carried out under general anesthesia and air was found to enter the area in the posterior fossa previously believed to be a "dermal cyst" (fig 3). The patient was taken to the operating room for exploration of the posterior fossa.

At operation the dura over the cerebellar hemispheres appeared normal. Upon turning a dural flap the arachnoid membrane was kept appeared normal and beneath this thin covering spinal fluid





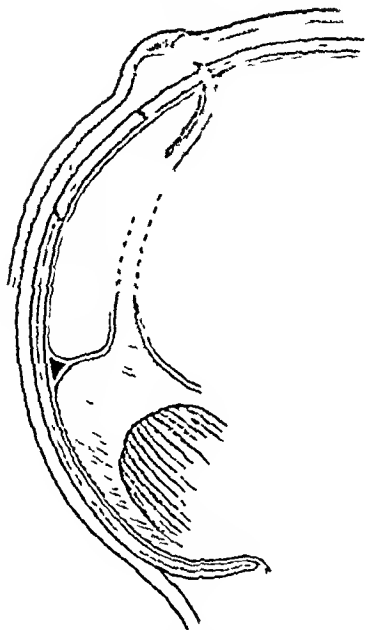
*Figure 3 (case 2). Posteroanterior and lateral pneumoencephalograms, showing air in area of "cyst."*

of air and droplets of Lipiodol could be seen. The arachnoid was opened widely. It was then apparent that the cerebellum was abnormal. The two normal appearing hemispheres could be retracted apart and were separate except at the uppermost ventral part where they were connected across the midline by several large veins. In view of the patient's lack of symptoms it did not seem justified to explore this area further although the aplasia of the vermis and midline structures seemed almost complete. The under surface of the posterior part of the tentorium was easily visualized. No dermoid cyst was found. Instead an inverted funnel was seen in the midline where apparently the "dermal sinus" widened out and emptied directly into the subarachnoid space (fig 4). One large vein traversed the opening in the midline and several small bridging veins descended to the veins previously seen in the midline in the superior aspect of the cerebellum. The operation was terminated.

Postoperatively the child did well and was discharged on the thirteenth day.

The pathologist's report on the specimen of skin and upper sinus tract removed at the first operation was "consistent with cicatrization wall of dermoid cyst."

Review of the slides (fig 5) revealed that normal skin of the scalp surrounded a central depressed area. There was loss of almost all the hair follicles, sweat glands, and sebaceous glands in the depressed area.



*Figure 4 (case 2) Drawing of sinus tract reconstructed from roentgenograms and surgical findings. (Mid sagittal view)*

and the normal collagen of the dermis was disorganized. A striking feature was the great number of dilated tortuous thin-walled blood vessels although these did not appear to represent a true hemangioma. The epidermis was continuous on the surface and did not extend into a sinus. The dermis was scarred and was continuous with an underlying cicatricial stalk containing no skin elements. There was a cellular layer, resembling dura, around the stalk. The findings were consistent with those of a meningocele although it might represent in part, an abortive congenital dermal sinus.

*Comment.* It is thought that this was an unusual case from the standpoint of pathogenesis. Clinically the external lesion and sinus tract appeared to be typical of a congenital dermal sinus.



*Figure 5 (case 2) Photomicrograph of section through externally presenting lesion (Hematoxylin and eosin stain  $\times 100$ )*

By emptying into the subarachnoid space it had aspects of a meningocele. The congenital nature of the defect was further shown by the associated aplasia of the midline structures of the cerebellum.

**Case 3** A 7 week old white girl was admitted to this hospital because of an occipital mass present since birth (fig 6). Pregnancy delivery and postnatal development had been normal. Physical and neurologic



*Figure 6 (case 3) Occipital mass with "port wine" discolored area on superior surface*

examinations revealed a firm rounded mass  $\frac{3}{4}$  inch in diameter in the midline of the occiput. It did not transilluminate and did not pulsate with heart beat, respiration or crying. An associated "port wine hemangioma" was present at the base of the mass.

Röntgenograms of the skull revealed a small radiolucent defect 5 mm in diameter, in the occipital bone under the center of the overlying mass. Ventriculograms failed to show any abnormality except small occipital ventricular horns bilaterally symmetrical which were considered within the limits of normal variation. The diagnosis of encephalocele was concurred in by all observers and the patient scheduled for craniotomy.

At operation the mass was discovered to be a "dermoid cyst" when the tumor burst and sebaceous material escaped. The stalk through the bone went through the meninges also and ended blindly in the tissue of the cerebellum.

Following operation the child did well and was discharged on the twelfth postoperative day.

The pathology report described the gross specimen as a cylinder of skin with an attached underlying cyst filled with hair and sebaceous material measuring 2.5 cm in diameter. The diagnosis was "dermoid cyst occiput."

Review of the slides (fig. 7) revealed that the cyst was lined by skin showing gentle papillation of the epidermis with an abundant stratum corneum. The numerous hair follicles, sebaceous glands, and sweat



Figure 7 (case 3) Photomicrograph of section through cyst. (Hematoxylin and eosin stain,  $\times 100$ )

December 1957

## CONGENITAL DERMAL SINUS AND CYST

1777

glands were mature although the intervening connective tissue was looser than normal and contained many large capillary channels. Vascular scar tissue is noted in the deep dermis at one point. The diagnosis is congenital dermal cyst.

*Comment* In retrospect the port wine hemangioma and the firmness of the occipital mass should have led to at least the suspicion of a congenital dermal cyst preoperatively. The pathologic picture was typical of a dermal cyst. The case is presented to illustrate that clinically the differential diagnosis of this condition and encephalocele is not always clear cut.

*Case 4* Recently a 13 year-old girl was referred to one of us. On routine physical examination before going overseas she had mentioned a small occipital midline skin lesion. The patient was asymptomatic and had never had any signs or symptoms of meningitis.

Examination of the scalp revealed a flat reddish lesion 4 mm in diameter and raised 1 mm. It had never bled been tender or had any known discharge. The alert pediatrician had requested roentgenograms of the skull however and on close examination there appeared to be a small bony defect 2 mm in diameter in the occipital area compatible with a sinus tract. Neurologic examination was completely negative and surgical exploration was not recommended.

*Comment* The decision not to operate was received with much discussion. The literature was reviewed and many cases were reported which pointed out the danger of this portal of entry for infection of the nervous system.<sup>11, 12</sup> A suggestion has been made that the discovery of a congenital dermal sinus might be justification for excision before any signs of infection or obstruction from an enlarging cyst occurs.<sup>13</sup> Most of the clinical literature, however, is not statistically of value inasmuch as these congenital dermal sinuses and cysts have been included with the true neoplastic teratomas. Most conclusions reached have been on the basis of very few cases or on theoretical grounds. We are not familiar with any series of occipital dermal sinuses that have been followed without resorting to surgical intervention. In this case it was believed that even the small risk of signs of infection or of obstruction from an enlarging cyst in a non neoplastic congenital defect that presumably had been present for 13 years. This viewpoint admittedly is not presented with any conviction.

That the morbidity and mortality associated with these congenital dermal sinuses, treated or untreated, are important cannot be denied, even though they are relatively rare lesions. Although this may be a matter of some practical clinical importance, a recent text on neuropathology still lists these "dermoid cysts" under the chapter on neoplasms and not as congenital malformations.<sup>14</sup>

## SUMMARY AND CONCLUSIONS

The intracranial "dermoid" of the posterior fossa whether largely intracranial or external often is associated clinically with the teratoma group of neoplasms. It is believed that these lesions should be considered congenital defects and that they are not neoplasms. It is suggested that the term "dermoid" be discarded in favor of "congenital dermal" sinus or cyst. These lesions should be considered as a separate entity so that statistically reliable conclusions regarding their natural history may be reached.

Four cases of congenital dermal sinus or cyst of the posterior fossa are presented. The first case illustrates that the dermal cyst may occur in association with another type of congenital anomaly. The second case indicates that these lesions cannot always be distinguished clinically from other congenital anomalies. The third case demonstrates that the external dermal cyst may be mistaken clinically for an encephalocele. The fourth case in which only a presumptive diagnosis could be made, was presented to illustrate how little is actually known about the expected course of events in some instances of dermal sinus.

## REFERENCES

- 1 Sweet W H. Review of dermoid teratoid and teratomatous intracranial tumors. *Dis Nerv System* 1: 228-238 Aug 1940.
- 2 Ewing J. *Neoplastic Diseases: a Treatise on Tumors*. W B Saunders Co Philadelphia Pa 1940.
- 3 Hesse K. Teratoma and teratoid tumor of brain. *Arch Path* 9: 107-1219 June 1930.
- 4 Will R A. Teratomas. In *Atlas of Tumor Pathology* Sec III Fascicle 9 United States Armed Forces Institute of Pathology Washington D C 1951.
- 5 Baily P and Briggs J D. Intracranial chondroblastoma. *Am J Path* 5: 439-450 Sept 1929.
- 6 Jam W and Dudley H R. Teratoma in region of pineal body: report of case. *J Neurosurg* 14: 235-241 Mar 1957.
- 7 Baily P. Cranioblastoma: a review. *Surg Gynec & Obst* 31: 390-401 Oct. 1920.
- 8 Herrick G. Dermal versus epidermal holocystomas showing their attachment in cerebelloplegia. *Arch Neurol & Psychiat* 8: 65-285 Sept 1922.
- 9 Black S P W and Green W J. Four congenital teratoid atoperations with intracranial canal with observations on the histogenesis. *J Neurosurg* 7: 49-61 Jan 1950.
- 10 Sachs E Jr and Herrick G. Cerebral dumb supratentorial communicating with intracranial dermoid: report of 2 cases and review of literature. *J Neurosurg* 6: 97-112 Mar 1949.
- 11 Ingraham F D and Baily O T. Cystic teratomas and teratoid tumors of central nervous system infancy and childhood. *J Neurosurg* 3: 511-532 No 1946.
- 12 Ingraham F D and Minton D O. *Neurosurgery of Infancy and Childhood*, Charles C Thomas Publisher Springfield Ill 1954.
- 13 Cruikshank B L Jr and Herrick G. Delaney L J and Miller R J. Pineal cyst: a review of the literature. *Am J Path* 7: 233-37 Jun 1956.
- 14 Kline H I and Melliger C. Editorial aspect of pineal sinus. *T Am Pro Soc* (1941) 42: 247-249 1944.
- 15 Logue V and Tiller K. Pineal cyst with pineal infarction. *J Neurol Neurosurg & Psychiat* 15: 112 Feb 1952.

December 1957

# CONGENITAL DERMAL SINUS AND CYST

771

10. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
11. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
12. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
13. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
14. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
15. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
16. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
17. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
18. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
19. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
20. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
21. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
22. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
23. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
24. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
25. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
26. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
27. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
28. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
29. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
30. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
31. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
32. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
33. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
34. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
35. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
36. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
37. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
38. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
39. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
40. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
41. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
42. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
43. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
44. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
45. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
46. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
47. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
48. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
49. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
50. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
51. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
52. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
53. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
54. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
55. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
56. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
57. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
58. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
59. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
60. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
61. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
62. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
63. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
64. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
65. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
66. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
67. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
68. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
69. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
70. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
71. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
72. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
73. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
74. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
75. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
76. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
77. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
78. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
79. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
80. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
81. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
82. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
83. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
84. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
85. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
86. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
87. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
88. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
89. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
90. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
91. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
92. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
93. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
94. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
95. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
96. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
97. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
98. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
99. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955
100. Schmalz J T. A survey of 3 cases of dermal sinuses. *Am J Dis Child* 84: 365-371 Jul 1955

## EFFECTIVENESS OF NEW ORAL DIABETES TABLETS

"The effectiveness of these is greatest in older and milder diabetes. It should be stressed that it has been found almost totally ineffective in patients whose diabetes began in childhood or adolescence and in adult patients with severe diabetes. In such cases attempts to substitute oral treatment for insulin may lead to serious consequences. While extensive trials in several thousand cases have thus far not been found to show any serious toxicity the investigators and clinicians who have worked with the drug cannot say at the present that more widespread use over periods of several years may not be somewhat hazardous. Fortunately the manufacturer and all physicians are alerted to these possibilities and we may be sure that results of treatment will be closely scrutinized for some years to come so that any possible untoward effects may be prevented or stopped in good time. It is important to emphasize that rigid dietary management of diabetes remains the keystone of the arch of treatment. It is generally agreed that substitution of the new drug for insulin in patients who have received the latter should be very closely supervised and may necessitate hospitalization for the initial period. It will take many years to judge the effect of any such drug on life expectancy and occurrence of complications in diabetes. During the past few months a still newer drug N<sup>1</sup> beta phenethylformamide in diabetes. This substance does not belong to the tolbutamide chemical family. The available information on DBI is too scant as yet to allow any preliminary conclusions."

—AMERICAN DIABETES ASSOCIATION  
in *Journal of Indiana State Medical Association*  
p 1114 Sept 1957



# FIRST AID MEASURES IN POISONING

The aim of first aid measures is to help prevent absorption of the poison. SPEED is essential. First aid measures must be started at once. If possible, one person should begin treatment while another calls a physician. When this is not possible, the nature of the poison will determine whether to call a physician first or begin first aid measures and then notify a physician. Save the poison container and material itself if any remains. If the poison is not known, save a sample of the vomitus.

## MEASURES TO BE TAKEN BEFORE ARRIVAL OF PHYSICIAN

### I. Swallowed Poisons

Many products used in and around the home, although not labeled "Poison," may be dangerous if taken internally. For example, some medications which are beneficial when used correctly may endanger life if used improperly or in excessive amounts.

In all cases, except those indicated below, REMOVE POISON FROM PATIENT'S STOMACH IMMEDIATELY by inducing vomiting. This can not be overemphasized, for it is the essence of the treatment and is often a lifesaving procedure. Prevent chilling by wrapping patient in blankets if necessary. Do not give alcohol in any form.

#### 4. Do Not Induce Vomiting If

1. Patient is in coma or unconscious
2. Patient is in convulsions
3. Patient has swallowed petroleum products (i.e., kerosene, gasoline, lighter fluid)
4. Patient has swallowed a corrosive poison (symptoms: severe pain, burning sensation in mouth and throat, vomiting)

#### CALL PHYSICIAN IMMEDIATELY

- (a) Acid and acid-like corrosives: sodium acid sulfate (toilet bowl cleaners), acetic acid (facials), sulfuric acid, nitric acid, oxalic acid, hydrofluoric acid (rust removers), iodine, silver nitrate (styptic pencil)
- (b) Alkali corrosives: sodium hydroxide—lye (drain cleaners), sodium carbonate (washing soda), ammonia water, sodium hypochlorite (household bleach)

---

From the Committee on Toxicology of the Council on Drugs of the American Medical Association, as published in the *Journal of the American Medical Association*, 1, October 1957, pages 655-658.

Reprints of this report may be obtained from Bernard E. Conley, Ph.D., Secretary, Committee on Toxicology, 4 M. A., 535 North Dearborn Street, Chicago 10, Ill.

If the patient can swallow after ingesting a corrosive poison the following substances (and amounts) may be given

For acids milk water or milk of magnesia (1 tablespoon to 1 cup of water)

For alkalis milk water any fruit juice or vinegar

For patient 15 years old—1 to 2 cups

For patient 5 years and older—up to 1 quart

**B Induce Vomiting When Non corrosive Substances Have Been Swallowed**

1 Give milk or water (for patient 15 years old—1 to 2 cups for patient over 5 years—up to 1 quart)

2 Induce vomiting by placing the blunt end of a spoon or your finger at the back of the patient's throat or by use of this emetic—2 tablespoons of salt in a glass of warm water

When retching and vomiting begin place patient face down with head lower than hips. This prevents vomitus from entering the lungs and causing further damage

**II Inhaled Poisons**

- 1 Carry patient (do not let him walk) to fresh air immediately
- 2 Open all doors and windows
- 3 Loosen all tight clothing
- 4 Apply artificial respiration if breathing has stopped or is irregular
- 5 Prevent chilling (wrap patient in blankets)
- 6 Keep patient as quiet as possible
- 7 If patient is convulsing keep him in bed in a semidark room avoid jarring or noise
- 8 Do not give alcohol in any form

**III Skin Contamination**

- 1 Drench skin with water (shower, hose faucet)
- 2 Apply stream of water on skin while removing clothing
- 3 Cleanse skin thoroughly with water rapidity in washing is most important in reducing extent of injury

**IV Eye Contamination**

- 1 Hold eyelids open wash eyes with gentle stream of running water immediately Delay of few seconds greatly increases extent of injury
- 2 Continue washing until physician arrives
- 3 Do not use chemicals they may increase extent of injury

**V Injected Poisons (scorpion and snake bites)**

- 1 Make patient lie down as soon as possible
- 2 Do not give alcohol in any form
- 3 Apply tourniquet above injection site (e.g., between arm or leg and heart) The pulse in vessels below the tourniquet should

not disappear nor should the tourniquet produce a throbbing sensation Tourniquet should be loosened for 1 minute every 15 minutes

4 Apply ice pack to the site of the bite

5 Carry patient to physician or hospital DO NOT LET HIM TALK

#### V1 Chemical Burns

1 Wash with large quantities of running water (except those caused by phosphorus)

2 Immediately cover with loosely applied clean cloth

3 Avoid use of ointments greases powders and other drugs in first aid treatment of burns

4 Treat shock by keeping patient flat keeping him warm and reassuring him until arrival of physician

#### MEASURES TO PREVENT POISONING ACCIDENTS

A Keep all drugs poisonous substances and household chemicals out of the reach of children

B Do not store nonedible products on shelves used for storing food

C Keep all poisonous substances in their original containers do not transfer to unlabeled containers

D When medicines are discarded destroy them Do not throw them where they might be reached by children or pets

E When giving flavored and/or brightly colored medicine to children *always* refer to it as medicine—*never* as candy

F Do not take or give medicine in the dark

G READ LABELS before using chemical products

---

#### HOW TO OBSERVE LIKE SHERLOCK HOLMES

A physician cannot afford mental pigeonholing Patients smell our moral pigeonholing or prejudice of any kind Still the physician should not accept all that is related as if he had blinkers He should watch for chronologic gaps inconsistencies and possible concealment of what may be important information He should listen carefully and critically and observe the patient as he tells his story how he carries himself how he speaks how he uses his hands Much information may be secured from observation alone During an interview the physician should be as observant as Sherlock Holmes "

—S C WERCH M D

in *Journal of Florida Medical Association*

p 244 Sept 1957

# PERINATAL MORTALITY ASSOCIATED WITH CESAREAN SECTION

DANIEL C. GOOD *Lieutenant MC USA*  
WILLIAM S. BAKER, Jr. *Captain MC US*

THE OBSTETRIC literature is replete with reports from several centers concerning the trend of cesarean section in recent years.<sup>1-3</sup> The technique of the operation and an account of its development throughout the years was ably presented by Young.<sup>4</sup> Emphasis has been placed on the need for a decrease in fetal and neonatal mortality resultant from traumatic vaginal deliveries, and a change in indications for cesarean section to attain that end has been suggested by DeSopo.<sup>5</sup> To further decrease infant wastage Kallreider<sup>6</sup> advocated a trial of labor in all dystocia cases with vertex presenting where no history of previous cesarean section is present. Delivery is carried out by cesarean section if vaginal delivery proves to be impossible. Landesmann<sup>7</sup> has pointed out the minimum risk to the fetus when delivered by section following an unsuccessful trial of labor as opposed to the potential hazard of repeat section producing an increased infant mortality incidence due to inaccurate estimations of fetal size and to rupture of the uterus. With the advent of antibiotics infection has been adequately controlled, and better transfusion techniques and well stocked blood banks appear to be the answer to the hazard of sudden blood loss or hemorrhage. Despite all of these improvements in modern obstetric practice there still is reported from most of our larger centers a definitely greater perinatal loss following delivery by cesarean section over the vaginal route but paradoxically a definite decrease in maternal mortality. In an effort to uncover some of the reasons for the apparent increase in perinatal mortality following cesarean section a study was carried out on all infant deaths associated with cesarean sections performed at this hospital during the period 1 April 1951 through 31 December 1956. Particular attention was directed to (1) the indication for section, (2) the type of anesthesia and agent used, (3) the stage of gestation at time of operative interference, and (4) the fetal weights in so far as these data had any bearing on the resultant

perinatal mortality. The facts uncovered and the conclusions arrived at during this study provide the basis for this report.

### METHOD AND MATERIAL

During the period 1 April 1951 through 31 December 1956, 25,667 patients were delivered at this hospital, and of these 556 (2.2 per cent) were by cesarean section. This is about one half the accumulated cesarean section rate of 4.02 per cent as reported from published literature by Schneider.<sup>1</sup> It has been the policy in this institution to individualize the indications for cesarean section in each case. The majority of women who were previously operated on in another hospital or by a physician unknown to our staff are usually delivered again by the abdominal route, but "once a section, always a section," is not a hard and fast rule in our hospital. Previous cesarean section was the indication for operation in only 51.7 per cent of the cases.

During the period under study, there were 43 infant deaths associated with 42 cesarean sections for an incidence of 7.72 per cent. An analysis of the indications for cesarean section as noted in table 1 will reveal that for 21 infants the cesarean operation was not the factor causing death.

The indications for performing the operations and the resultant fetal mortality are listed in table 2. All infant deaths are attributed to one indication only and thereby do not adversely affect the statistics. It is to be noted that uterine inertia *per se* was not considered as an indication, however, after reviewing the charts it was evident there may have been some sections performed for inertia and classified as fetal pelvic disproportion.

A comparison of our cesarean section fetal mortality with the national figures as reported by Schneider is contained in table 3. It will be noted our overall incidence of fetal wastage is higher than the national average but compares very favorably when computed annually except for the years 1953 and 1954, and no apparent reason for this is readily evident.

An analysis of all fetal deaths during the period under study is presented in table 4. Here a comparison is made with the annual fetal mortality occurring in this hospital from any cause and that associated with cesarean section. In every instance it will be noted that cesarean section was associated with the greater infant mortality.

The type of anesthesia employed and the agent used in each case in the study is found in table 5. It will be evident that over 50 per cent of the patients had spinal anesthesia and the next largest group received inhalation anesthesia using cyclopropane alone or in combination with other agents. The possible adverse effect of cyclopropane on 12 infants in the study will require further analysis.

TABLE 1 Data on fetal deaths associated with cesarean section 1951 to 1956

Case number	Age	Gravida	Para	Weeks pregnant	Fetal weight	Reason for cesarean section	Anesthesia	Cause of fetal death
1	31	4	3	31	2-15¼	Toxemia with abruptio placentae	Cyclopropane	Stillborn
2	29	6	3	40	5 0	Repeat	Pontocaine Hydrochloride spinal	Atelectasis
3	35	3	2	36	6-7¼	Abuptio placentae	Cyclopropane	Premature separation
4	31	10	6	38	4 1¼	Compound presentation	Spinal	Asphyxia
5	24	3	2	32	2 1¼	Toxemia	Spinal	Toxemia
6	26	3	2	32	3 7¼	Repeat	Cyclopropane	Prematurity
7	28	3	2	42	6-7	Transverse presentation	Cyclopropane	Stillborn
8	18	1	0	32	2 13½	Eclampsia	Cyclopropane	Atelectasis
9	18	2	0	41	6-1	Abuptio placentae	Cyclopropane and nitrous oxide	Stillborn
10	24	2	1	40	6-15¼	Prolapsed cord	Cyclopropane	Asphyxia
11	19	1	0	32	2 8	Toxemia	Spinal	Atelectasis
12	23	3	2	40	5 9	Repeat	Spinal	Atelectasis
13	25	8	7	32	5-2½	Repeat Premature labor	Spinal	Atelectasis
14	20	1	0	24	1 0	Diabetes	Local	Stillborn
15	16	1	0	33	3 4	Abuptio placentae	Spinal	Prematurity
16	21	1	0	33	4 6	Abuptio placentae	Cyclopropane	Stillborn
17	18	2	1	40	7 7¼	Diabetes	Spinal	Atelectasis
18	18	1	0	43	3 3¼	Toxemia	Spinal	Atelectasis
19	19	1	0	26	1 0	Toxemia	Local	Atelectasis
20	21	3	2	38	5 14	Repeat	Spinal	Atelectasis
21	35	9	8	39	6 ¼	Repeat abruptio placentae	Spinal	Atelectasis

TABLE I Data on fetal deaths associated with cesarean section 1951 to 1956—Continued

Case number	Age	Craniola	Years	Weeks pregnant	Fetal weight	Reason for cesarean section	Anesthesia	Cause of fetal death
22	25	4	0	42	6-9½	Cephalopelvic disproportion	Spinal	Atelectasia
23	28	2	1	41	6-2½	Repeat	Spinal	Atelectasia
24	43	1	0	39	2-14½	Toxemia	Spinal	Atelectasia
25	30	2	1	32	2-2	Placenta previa	Spinal	Stillborn
26	22	1	0	31	3-4	Gunshot wound	None	Prematurity
27	22	2	1	30	2-8	Placenta previa	Pentothal Sodium	Atelectasia
28	32	2	1	26	1-15	Abruptio placentae	Spinal	Stillborn
29	19	3	2	37	6-12	Repeat	Spinal	Atelectasia
30	18	2	1	40	4-15	Repeat	Spinal	Atelectasia
31	30	6	2	40	7-11½	Placenta previa	Cyclopropane	Atelectasia
32	21	1	0	32	8-5¼	Placenta previa	Spinal	Stillborn
33	21	1	0	32	3-7½	Placenta previa	Spinal	Pyothroblastoma
34	25	1	0	40	8-0	Cephalopelvic disproportion and toxemia	Local	Pneumonia
35	36	5	3	29	4-1½	Repeat abruptio placentae	Spinal	Atelectasia
36	35	2	1	40	5-13	Repeat	Spinal	Hyaline membrane
37	23	7	3	33	3-0	Placenta previa	Cyclopropane and Pentothal Sodium	Prematurity
37	23	7	3	33	2-8	twins	Spinal	Premature stillborn
38	27	4	3	36	3-12	Prolapsed cord	Spinal	Premature 2d twin
39	23	3	2	40	6-10	Placenta previa	Nitrous oxide ether and oxygen	Multiple congenital abnormalities
40	21	3	2	37	6-14	Repeat	Spinal	abcess
41	20	3	2	33	3-4	Placenta previa	Local cyclopropane	Prematurity
42	30	5	4	39	6-11½	Repeat	Cyclopropane	Pulmonary hemorrhage

TABLE 2 Indications for cesarean section and associated perinatal mortality

Indication for cesarean section	Total		Fetal deaths	
	Number	Per cent	Number	Per cent
Previous section	288	51.7	11	2
1st fetal pelvic disproportion	9	17.3	1	10
Preeclampsia—eclampsia without abruptio placentae	62	11.2	7	11.0
Placenta previa	36	6.7	9	25.0
Malpresentation	30	5.4	7	6.6
Prolapsed cord	13	4.1	2	8.7
Abruptio placentae	10	1.8	8	80.0
Diabetes mellitus	1	0.7	2	50.0
Previous myomectomy	2	0.4	-	-
Pelvic tumors	2	0.3	-	-
Congenital hip deformity	1	0.2	-	-
Vaginal stenosis	1	0.1	-	-
Gunshot wound	1	0.1	1	100.0
Total	556	100.0	42	7.72

TABLE 3 Comparison of perinatal mortality associated with cesarean section during period studied with accumulated published reports of incidence of fetal mortality associated with cesarean section

Year	Number of deliveries	Cesarean sections			
		Number	Per cent	Fetal mortality	
				Number	Per cent
1951*	2,665	70	2.63	4	5.7
1952	4,159	102	2.45	6	5.9
1953	4,302	86	2.00	10	11.6
1954	4,638	79	1.71	11	13.8
1955	4,151	99	2.37	4	4.0
1956	5,752	120	2.08	8	6.7
Total	25,667	556	2.16	43	7.72
1907-1951†	1,146,211	46,038	4.02	1,877	6.89

April through December



TABLE 4. Comparison of fetal perinatal mortality during 2 periods each of which has a cesarean section

Year	Stillborn		Cesarean section		Perinatal death		Cesarean section		Cesarean section perinatal death	Cesarean section term death
	Number	Percent	Number	Percent	Number	Percent	Number	Percent		
1951	79	1.09	1	1.4	44	1.68	3	4.3	2	2
1952	52	1.25	2	2.0	97	2.21	4	4.0	3	3
1953	49	1.14	1	2.3	78	1.8	8	9.3	6	4
1954	4	0.91	2	2.5	70	1.71	9	11.4	6	3
1955	51	1.2	1	1.0	8	2.0	3	3.0	2	2
1956	70	1.36	1	0.8	83	1.44	7	3.8	4	4
Total	302	1.2	9	1.6	443	1.7	34	6.1	25	20

TABLE 5. Type of anesthesia and anesthetic agent used in the 41 cases of fetal death where anesthesia was employed

Indications for cesarean section	Type of anesthesia and anesthetic agent					Total
	Regional		Intravenous	Inhalation		
	Spinal anesthesia	Local anesthesia	Pentothal	N <sub>2</sub> O-O <sub>2</sub> ether	Cyclo- propane	
Previous section	9				2	11
Cephalopelvic disproportion	1					1
Pregnancy term with abruptio placentae	4	2			1	7
Placenta previa	3		1	1	3	8
Abruptio placentae	4				4	8
Malpresentation	1				1	2
Prolapsed cord	1				1	2
Diabetes mellitus	1	1				2
Total	24	3	1	1	12	41

This table contains data for only one death (case No. 37 in table 1).

## DISCUSSION

With the increasing safety of the cesarean section operation from the maternal point of view, nationally there has been a steady increase in its use in complicated cases. But all too often abdominal delivery has not resulted in a viable baby. Undoubtedly the indications for the cesarean operation have materially increased the fetal mortality in certain instances.

However, there are a considerable number of infants lost simply because of poor timing, the operation being performed either too early or too late. Of the 556 cesarean sections performed during the period under investigation, only 513 infants survived the neonatal period, making the fetal loss 7.72 per cent, while the gross incidence of fetal loss for all deliveries was 2.81 per cent during the same period at this hospital.

A study of table 1 will reveal the individual cause of death of each infant delivered by cesarean section in the study. Over half of the total infants expiring after section weighed less than 5 pounds. Abruptio placentae, diabetes mellitus, and placenta previa in that order accounted for a total of 19 infants' deaths. This is in accord with other reported series.<sup>4, 5</sup> Eleven infants died incident to repeat cesarean section and, of these, six were under 6 pounds in weight. This bears witness to the common error of operating before roentgenographic evidence of maturity is demonstrable in the infant. Since July 1954 a more careful appraisal of fetal age has been attempted in all cases prior to carrying out elective cesarean section. Five infants died following repeat cesarean section during this period, but only one infant died as a result of prematurity.

Perhaps one of the reasons for the noticeable reduction in fetal mortality during this period was the initiation of the policy of carrying certain preclampsic patients closer to term with the aid of antihypertensives and not resorting to immediate induction or surgical delivery without giving due consideration to the state of viability of the fetus. Also more emphasis has been placed on the use of roentgenography as an aid in determining fetal age as described by Adams.<sup>7</sup>

An analysis of the type of anesthesia and agent used in respect to the resultant fetal mortality revealed certain interesting facts. Two of 11 repeat sections had cyclopropane anesthesia, and both infants died in the neonatal period. One was term and the other premature. Four patients with abruptio placentae and three with placenta previa received cyclopropane anesthesia. Three stillbirths and one neonatal death resulted in the abruptio placentae group, and three neonatal deaths in the placenta previa group. One section for placenta previa was performed in the case of a twin pregnancy at 33 weeks of gestation. Certainly in view of several studies<sup>8-12</sup> on the adverse effect of general anesthesia, and cyclopropane in particular, on the oxygen carrying capacity and oxygen-utilization rate in the infants' circulation it seems reasonable to conclude that the fetal outcome in the aforementioned cases might have been different if local infiltration anesthesia had been used.

A comparison of the fetal mortality following cesarean section to that following vaginal delivery is, at best, difficult and inaccurate because the two groups of patients are categorically

different. Certain patients developing specific obstetric complications in the last trimester are likely to be delivered by cesarean section, however, these same complications probably would place the infants in jeopardy and lead to an increased fetal loss if they were delivered vaginally. Perhaps even more would have died if they had all been delivered vaginally. It would be of considerable interest to know the actual number of infant lives saved by the cesarean operation, but this can only be estimated.

### SUMMARY AND CONCLUSIONS

In a study of all infant deaths associated with cesarean sections performed at a naval hospital during the period 1 April 1951 through 31 December 1956, particular emphasis was placed on the stage of gestation, type of anesthetic and agent used, fetal weight, and indication for section at the time of operation as possible causative factors in the production of increased fetal wastage.

While the maternal mortality rate following cesarean section has been reduced to less than 1 per cent in most institutions, this study reveals that at this hospital the fetal loss following cesarean section during the period studied is about 7.72 per cent, well more than twice the fetal mortality following vaginal delivery. Further analysis revealed that over half of the infants lost following operation weighed less than 5 pounds regardless of the indication for surgery.

Exceptional care must be taken in choosing cases for cesarean section. Every effort should be made to avoid prematurity, and in this respect the fetal size and gestational age should be paramount in deciding the time an elective cesarean section is to be performed. The choice of anesthesia for a given indication is also considered extremely important to the fetal outcome.<sup>12</sup> Inhalation anesthesia using cyclopropane or other gaseous depressants should not be utilized in any instance where the fetus has already been precipitated into an hypoxic state.<sup>8-12</sup> Conservative management of placenta previa is recommended as a means of decreasing the incidence of prematurity with its resultant high perinatal mortality in cases that eventually are delivered by cesarean section. It also is urged that a reasonable effort be made to carry certain severe preeclampsia patients closer to term with the aid of antihypertensives, as an additional means of decreasing fetal wastage in cases requiring cesarean section for delivery.

### REFERENCES

1. Scher, B. R. W. *Cesarean section statistics in community and United States.* *Am. J. Obst. & Gynec.* 68: 108-109, Oct. 1954.
2. K. Ited, D. F. *Criticism of malpractice on the basis of the review.* *Am. J. Obst. & Gynec.* 63: 392-399, Feb. 1952.
3. Harris, J. M. R. Blum, G. G. G. Burg, B. L. Stollman, B. O. and Fenmore. *M. S. C. A. F. F. re-evaluation of indications for cesarean section based on a study of 2617 cases.* *West J. Surg.* 59: 33-35, July 1951.

- 4 D Esopo D A Review of cesarean section at Sloane Hospital for Women 1942-1947 *Am J Obst & Gynec* 59 77-95 Jan 1950
  - 5 Landerman R Fetal mortality in cesarean section *Am J Obst & Gynec* 61 557-564, Mar 1951
  - 6 Young J H *Cesarean Section The History and Development of the Operation from the Earliest Times* H. V. Lewis & Co Ltd, London 1944
  - 7 Adams T W Intrauterine roentgenography as aid to determining fetal age *Obst & Gynec* 5 43-48 Jan 1955
  - 8 Shields L V and Taylor E S Serial oxygen saturation studies of newborn infants following obstetrical complications difficult deliveries and cesarean section *Am J Obst & Gynec* 73 1011-1021 May 1957
  - 9 Taylor L S Role of analgesia and anesthesia in fetal salvage *J A M A* 150 1481-1483 Dec 18 1954
  - 10 Montgomery T L Anesthesia in cesarean section *Am J Obst & Gynec* 64 534-541, Dec 1957
  - 11 Taylor F S Safeguarding the newborn—the obstetrician's responsibilities *Am J Obst & Gynec* 64A 577-583 Dec 1952
  - 12 Bundesen H Potter L J Fishbein W J Bauer F C and Plotzke G V Progress in reduction of needless neonatal deaths challenge to health officer and medical profession *J A M A* 148 907-917 Mar 15 1952
- 

### POLIOMYELITIS VACCINE AND IMMUNITY

"The amount of virus antigen injected is the principal determinant of the intensity of the immune response. This is reflected in the level of antibody induced and/or in the degree of immunologic hyperreactivity effected. Although antibody at demonstrable levels tends to persist for long periods it has also been observed that immunologic hyperreactivity continues even in those cases in which antibody has declined to nonmeasurable levels. The indications are that immunity to paralysis is mediated not only through existing antibody in the circulating blood but through the mechanism of immunologic hyperreactivity that calls forth antibody sufficiently rapidly after exposure to intercept invasion of the central nervous system even though pharyngeal or intestinal infection may have occurred."

—JONAS F SALK M D  
in *Journal of American Medical Association*  
p 1459 Dec 15 1956

# POTABLE WATER ON SUBMARINES

ARTHUR D JAMES *Lieutenant MC USN*

WARREN R SANBORN *Lieutenant (junior grade) MSC USN*

**C**ONTAMINATION of potable water with sewage, polluted water, or other nonpotable liquid presents a perennial hazard in public health. This is particularly so aboard a ship, and is acutely true within a submarine. Mount and Floyd<sup>1</sup> reported an outbreak of 326 cases of *Shigella flexneri* III aboard a cruiser, centering around a cross connection between potable water and salt water systems in a dishwashing machine. Salt water outlets in food service spaces have since been ordered out by regulation. Cheever<sup>2</sup> reported the survival of shigella in sea water for as long as 76 hours, emphasizing the danger of contamination of equipment by harbor water. While the purpose of this article is to point up sources of trouble in the potable water supply of submarines and to suggest possible methods of correction, many useful parallels may be drawn between problems of submarines and those of surface vessels and shore installations.

A study of the potable water systems of submarines in a typical submarine squadron was initiated in 1955 as a result of finding contaminated water in potable water tanks during routine quarterly checks. In an effort to determine all possible causes for this contamination, procedures and installations were discovered that represent potential hazards in all submarine squadrons.

## MATERIALS AND METHODS

The study concerned the following salient features: (1) water sources; (2) means of transfer; (3) water in tanks; (4) tank arrangements; (5) venting systems; (6) possible cross connections with nonpotable systems; (7) laboratory studies; and (8) malfunction reports. Diagrams and photographs were made to illustrate possible cross connections, improper venting arrangements and potable water hose stowage and certain water sanitation deficiencies.

A concentrated survey of the potable water tanks aboard a representative group of submarines was undertaken in an attempt

December 1957

## POTABLE WATER ON SUBMARINES

1793

to correlate nonpotable water with the deficiencies mentioned above. Standard methods for total bacterial count and coliform counts were employed. The same methods were used to study the water hoses, in which case samples of water were obtained from the hose as it first came through and after specified periods of time.

### RESULTS

The submarines were divided according to building yard into two major groups. Those from one yard had 22 of 254 tanks (8.7 per cent) positive for coliform organisms over a five-month test period. In the other group only 2 of 107 tanks (1.9 per cent) were positive.

The following deficiencies were noted in the potable water systems, equipment, and handling procedures<sup>1-7</sup> aboard the submarines studied:

**Inadequate Air Breaks in Vents From Potable Water Tanks.** The vents on some tanks on all types of submarines had inadequate air breaks. The air break is essential to prevent the back flow of liquid or spray into the potable water system (figs. 1 and 2).

**Common Bulkheads Between Potable and Nonpotable Liquid Tanks.** The number 1 potable water tanks on all submarines studied had a common pressure bulkhead with sanitary tank number 1. On some submarines the number 2 sanitary tank adjoined number 4 potable water tank.

**Common Bulkhead With Sea Water.** All potable water tanks had a common bulkhead (the pressure hull) with nonpotable liquid—the water in which the submarine was floating. This is a major discrepancy common to many other types of vessels.

**Scuttle Butts Constructed So That the Drain Line Enclosed the Inlet Line and Fittings.** Several submarines were found with types of scuttle butts (drinking fountains) which allowed this possibility of cross connection between potable and nonpotable systems.

**Direct Connections Between Potable Water Systems and Sanitary Systems.** While it was recognized that due to the inherent complexity of the operating systems of a submarine almost any type of cross connection between systems was possible, consideration was given only to the more probable causes of contamination. The scuttle butt mentioned above was one, the other was a drain directly to sanitary tank number 2 from the hot water tank in the galley of one group of submarines. This was evident on all blueprints, but in most instances it had been capped off.

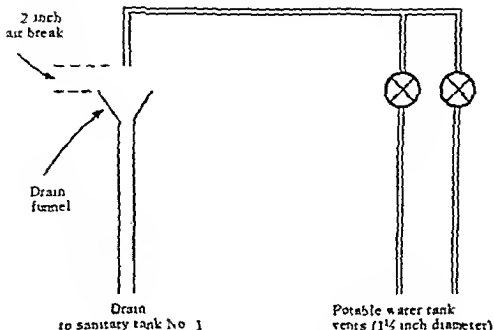


Figure 1 Proper venting of potable water tanks aboard submarines.

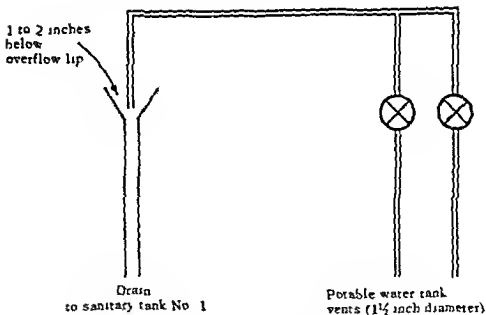


Figure 2 Improper venting of potable water tanks of submarines.

**Access Hatch in the Top of the Potable Water Tank Forming Part of a Deck** In many submarines of both groups this deficiency occurred however in most cases the hatch was well sealed and protected by a false cover. The results of laboratory tests for

contamination were inconclusive. Nevertheless, a serious hazard was discovered on one type of one group of boats. Potable water tank number 2 lay alongside potable water tank number 3, and the access hatch to the potable water tank was in the lower deck. The contents of the sanitary tank under certain dry conditions backed up into the shower, creating a serious hazard by covering the potable water tank hatch with sewage resulting in possible back flow or aerosol through the water tank hatch (fig. 3).

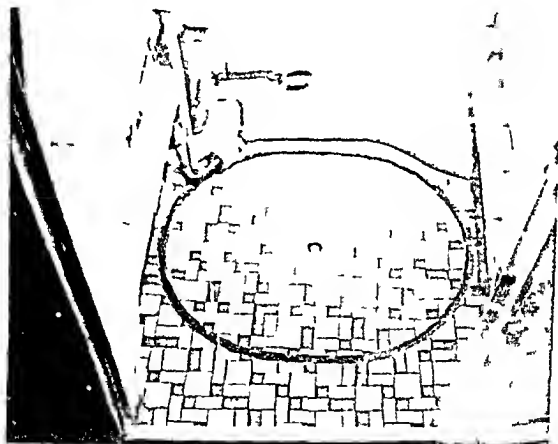


Figure 3 Vent for potable water tank number 4 and access hatch to tank in crew's shower

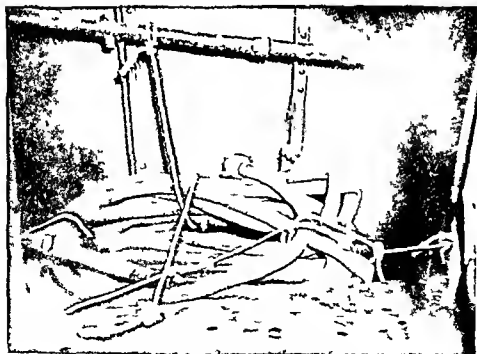
**Improper Stowage of Water Hoses** Stowage of water hoses varied greatly. Some hoses were found in the relatively clean environment of dry stores. Others were in the well in the forward torpedo room. Still others were stowed topside in various places exposed to weather and spray. None were capped, and few were clean (figs. 4-6).

**Inadequate Flushing of Water Hoses Before Use** Many times it was found that persons connecting water hoses did not flush them adequately, if at all, before filling the tanks. It was found that flushing for 2-3 minutes was required to clean the hoses sufficiently to obtain a minimal bacterial count (fig. 7).





*Figure 4 Improper stowage of potable water base by forward escape trunk in superstructure*



*Figure 5 Improper stowage of potable water base outside pressure hull near forward escape trunk. Improper type hose for potable water*



*Figure 6. Improper stowage of potable water hose in well under forward torpedo room*

#### DISCUSSION

Certain of the inadequacies in potable water systems and water handling aboard submarines were of a major nature. Why did the submarines from one shipyard have a higher percentage of contamination than those from another shipyard? The significance of this situation and the reasons for it called for further, more specialized study. Tank placement in opposition to Public Health standards certainly deserves investigation as to the pros and cons of this design feature. Access to tanks is another major design feature that warrants examination as to feasible methods of change in certain instances.

The important considerations of the moment, however, are not these major decisions, but are the actions that can be taken immediately by ship's personnel to improve the potable water

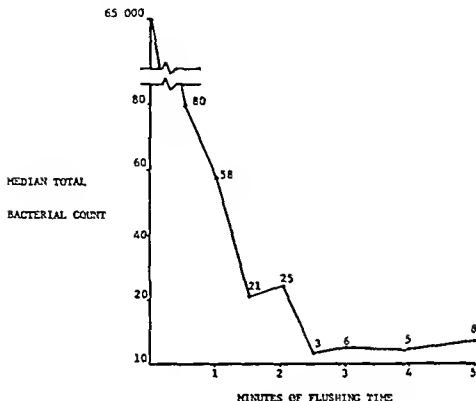


Figure 7 Effect of flushing time on median total bacterial counts per ml sample on six water hoses.

supply and protect the crew's health. The air break on the vents to the potable water tanks can be made adequate with a minimum of pipe fitting ability. The requirement is that the air break be between the opening of the vent and the top edge of the funnel or trough below it must be twice the diameter of the vent line. Therefore a 1½ inch diameter vent pipe should have 3 inches between it and the drain below it. A simple shortening or lengthening of one or two pipes can remedy this situation easily. It was discovered during the study that in many instances an inadequate air break had resulted from improper reinstallation after some ship repair or alteration.

Most of the scuttle butts aboard submarines were of a satisfactory type, but a few were of the improper type. Installation of a free draining model would be a simple and inexpensive matter.

Hose stowage care and handling is an important problem. Hoses should be kept clean at all times and periodically disinfected with chlorine solution. The frequency of chlorination is determined by usage and accidental contamination. Whenever there is question about the sanitation of a hose, chlorinate it.

otherwise, in normal usage chlorine water should be added at least once every three months. Keep it in a bottle with the ends when not in use. Water hoses are used by crews at the harbor water whether they are capped or not. If such as this occurs, disinfect the hose with chlorine solution before it is used. Flush the potable water hose before use. Three minutes flushing is adequate under normal conditions.

Store potable water hoses, capped, in a clean dry place. Store them topside. Submarines are crowded, but space for a set of water hoses can be found. When in a major navy port find out if specialized workers are designated to make water connections for the ship. Use them, even if it requires a short wait.

Direct connections between potable and nonpotable systems such as those mentioned above should be determined and remedied. This is a quick job for navy auxiliaryman. Access hatches to potable water tanks should be inspected periodically for tightness and should be cleaned of any debris that has collected on them.

Finally, consider testing and chlorinating the water that goes into the potable water tanks. Nearly 100 per cent of the time the water obtained from an approved source in the continental limits of the United States is satisfactory when it gets to the ship. These studies have shown, however, that there are many ways the water can become contaminated after this point. The percentage of contaminated tanks discovered in this investigation points up the necessity for bacteriologic testing of the water in the tanks at least on a quarterly basis. Furthermore, normal chlorination of water never hurt anything, and it is a cheap safety factor. From unknown continental United States sources and all foreign sources chlorinate to at least 2.0 parts per million residual chlorine after contact time of 30 minutes.

Water borne disease can disable a submarine or seriously impair its fighting readiness. The same applies to ships and shore installations. The discrepancies and frequency of contamination observed, therefore, make it mandatory to correct all deficiencies in equipment and to handle potable water properly.

#### SUMMARY

Study of the potable water systems of submarines in a typical squadron disclosed discrepancies both in equipment and in procedures. Positive tests for coliform organisms were obtained from 8.7 per cent of 254 tanks in submarines from one shipyard but from only 1.9 per cent of 107 tanks in submarines from another shipyard, suggesting a relation to type of construction and

nature of equipment. Of 8 potential sources of contamination observed, 6 had to do with equipment or construction and 2 with procedure. The results indicate need for (1) emphasis on proper handling procedures, (2) a regular check of potable water tanks for contamination, and (3) a more complete and detailed study of causes of contamination of potable water tanks aboard submarines.

#### REFERENCES

- 1 Mount, R. A. and Floyd, T. M. Dysentery outbreak aboard a cruiser in Apra Harbor, Guam, Marian Islands. *U S Am. M. Bull.* 43: 240-249 Mar-Apr 1948.
- 2 Cheever, F. S. Dysentery outbreak aboard naval vessels in San Pedro Bay, Philippine Islands. *U S Am. M. Bull.* 46: 479-494 Apr 1946.
- 3 American Public Health Association. *Standard Methods for the Examination of Water, Sewage, and Industrial Wastes*. 10th edition. Prepared and published jointly by American Public Health Association, American Water Works Association, and Federation of Sewage and Industrial Wastes Associations. New York, N. Y. 1955.
- 4 United States Public Health Service. *Handbook on Sanitation of Vessels in Operation, Sanitation Features and Facilities on Vessels in Operation*. United States Federal Security Agency. Sanitation Division. Public Health Service publication 68. Washington, D. C. 1951.
- 5 United States Public Health Service. *Handbook on Sanitation of Vessel Construction*. United States Department of Health, Education and Welfare. Public Health Service publication 393. Washington, D. C. 1954.
- 6 United States Public Health Service. *Handbook on Sanitation of Vessel Water Using Pumps*. United States Department of Health, Education and Welfare. Division of Sanitation. Public Health Service publication 274. Washington, D. C. 1954.

---

#### RESPONSIBILITY OF AUTHORSHIP

Publication of favorable results carries the moral obligation of immediate rectification or disavowal if the recommendations later prove to be of little or no value. If this is not done, many physicians attempting conscientiously to keep up with the latest developments in medicine may continue to follow the views in the original paper long after its author or others have decided that the concept has no merit. This is particularly true among physicians out in the grass roots who rely more on the journals than do their city cousins and who, with reason, are greatly influenced by optimistic reports coming out of the large research institutions.

#### —EDITORIAL

Massachusetts Physician,  
pp 183-184 May 1957



## Clinicopathologic Conference

U S Air Force Hospital, Parks Air Force Base, Calif •

### Fever, Convulsions, Coma

**Summary of Clinical History** This 2½-year old, white female child was admitted to this hospital after having been ill with a respiratory infection for over one week. Seven days, and again five days prior to admission, she had been given penicillin by injection. One day before admission she had been given vitamin B for vomiting. Therapy with Aureomycin Hydrochloride (brand of chlortetracycline hydrochloride) was started at that time.

During the 24 hours before admission she had a high temperature and had been delirious. She had complained of pain in the right arm a few days before admission.

**Physical Examination** On admission her rectal temperature was 105°F. She appeared acutely ill and had a "glassy stare." The right eardrum was dull and bulging with exudate behind it. The left ear was normal. The throat was injected. There were fine rales over both bases, more marked on the left. No dullness was noted. The heart beat was rapid (110 per min) but regular. No murmurs were heard. The abdomen, genitalia, and extremities were normal.

**Laboratory Studies** On admission the red blood cells numbered 4,560,000 per  $\mu$ l and the hemoglobin was 12.5 grams per 100 ml. The white blood cells were 6,550 per  $\mu$ l with 4 per cent meta-

---

Col John W Lindesty, USAF (MC), Commander. From the Laboratory Service.  
Maj Robert E Pierce USAF (MC) Chief.

myelocytes, 17 per cent band forms, 61 per cent neutrophils, 15 per cent lymphocytes, and 3 per cent monocytes. The urine contained a few epithelial cells.

**Course in Hospital** The following medications were ordered on admission. Aurilgan ear drops in both ears, four times daily. 0.25 per cent solution of Neo-synephrine hydrochloride (brand of phenylephrine hydrochloride) as nose drops, four times daily, steam inhalations. Chloromycetin Palmitate (brand of chloramphenicol palmitate), Linctus Compound as needed for cough. Diet, as tolerated, with forced fluid intake, sponge baths and 200 mg of aspirin as needed for fever of 103.5°F or above, and 0.6 ml of ABDEC (multivitamin preparation) twice daily.

The lowest temperature the day of admission was 101.8°F. It was 103 to 104.6°F for most of the day and remained elevated the following day. A roentgenogram of the chest revealed bilateral bronchopneumonia. White blood cells now numbered 4,650 per  $\mu$ l, with 16 per cent band forms, 33 per cent neutrophils, 40 per cent lymphocytes, and 9 per cent monocytes. Brucella, *Salmonella typhosa*, *Salmonella paratyphosa*, and cold agglutination tests were negative. Stool cultures revealed no pathogenic organisms.

The day after admission the patient had a convulsion which lasted 3 minutes. An enema of 8 ml of paraldehyde in mineral oil was given, part of it being retained. Following sponge baths, administration of aspirin, and a small enema, her temperature fell to 99.8°F.

At 0210 on the second hospital day the child had a convulsion which persisted for over one hour. Paraldehyde was given by rectum but was expelled with a green, liquid stool. At 0240 and again at 0255, 200 mg of Luminal Sodium (brand of phenobarbital sodium) was given. Her temperature at 0255 was 106.4°F. The convulsions continued and ether was given by mask with only temporary relief. At 0345 a lumbar puncture was performed, after which the convulsion ceased although the patient remained unconscious. The spinal fluid was clear and contained 1 lymphocyte per  $\mu$ l. The spinal fluid sugar was 113 mg per 100 ml, total protein, 24 mg per 100 ml. Chlorides, 620 mg per 100 ml, and culture, negative. One gram of Gantrisin (brand of sulfisoxazole) in 100 ml of water, 5 per cent dextrose in water, and 130 ml of blood were given through a venous cutdown.

Convulsive movements persisted intermittently until noon. At 1400 the patient's color was poor and her pulse was weak. Suction was applied and a mucus plug was removed. The child's color improved following this. Her temperature was 98.8°F and remained below 100°F the remainder of the day. Gantrisin was given twice daily, and 7.5 ml of blood and 40 units of Aethar gel (brand of corticotropin) were given.

The patient's condition remained about the same on the 11th hospital day. The highest temperature was 102°F (38.9°C). Previous medications were continued, 100 ml of blood was given and intramuscular injections of 250 mg of Chloroquine were given twice daily. On this day her face was edematous.

She improved slowly over the next few days. On the fifth hospital day Vinco formula was begun by tube. The child's temperature ranged from 98.6° to 100°F. She remained comatose with occasional stirring and groaning. Her stools were meconium-like. On the sixth hospital day the liver was palpable 4 fingers breadth below the right costal margin. There was roentgenographic evidence still of bilateral bronchopneumonia. There was no cardiac enlargement. Urine was checked daily for sulf crystals, but none was found.

On the seventh hospital day the liver edge was below the umbilicus. The patient opened her eyes and moved but remained on the verge of consciousness. Her temperature remained below 100°F. One half unit of plasma was given every 12 hours. Her temperature spiked to 106°F on the ninth day, but dropped rapidly. The liver gradually decreased in size. She vomited small amounts of what apparently was old blood. Her temperature then began climbing to 105°F. On the eleventh day Gnttrin was discontinued and 250 mg of Terramycin Hydrochloride (brand of oxytetracycline hydrochloride) was given every 12 hours. She remained semicomatose. Stools remained meconium-like and rales continued in the lungs. The white blood cell count remained low, with a high of 11,100 per  $\mu$ l on the eleventh day, with 12 per cent band forms, 58 per cent neutrophils, 28 per cent lymphocytes, and 2 per cent monocytes. The child appeared spastic. Throat culture taken on the twelfth day revealed "Streptococcus"

Early on the sixteenth day the patient stopped breathing but started again with artificial respiration. The lungs contained rhonchi. She became stuporous, and oxygen was necessary. A lumbar puncture on that day disclosed clear colorless fluid with an initial pressure of 224 mm of water. About 15 ml of fluid was removed, following which the pressure was 90 mm of water. The spinal fluid contained 1 lymphocyte, the sugar was 93 mg per 100 ml, total protein, 18 mg per 100 ml, chlorides, 560 mg per 100 ml, and the Pandy test was negative. The patient was more edematous and her abdomen was distended. Her respirations became weaker and shallow, and cyanosis increased. The patient died on the seventeenth hospital day.



## DISCUSSION

**Doctor Barkin** This case is that of a 2½-year-old female child who had a respiratory infection for over a week and was admitted with a high fever. She had been delirious for approximately 24 hours before admission. A week before admission she had been given two injections of penicillin which had very little effect on the fever. She also vomited on the day before admission and had some pain in her right arm. There is no other mention of this symptom and it was not severe. Aureomycin was started and apparently discontinued the same day.

When she was admitted she had a temperature of 105°F and appeared acutely ill. This indicates to me a bacterial infection. Many children that we see in the clinic up to 3 or 4 years of age may have a temperature of 103° to 104°F, and there is one child I am thinking of who had a temperature of 107° for a week with nothing more than we could find than an upper respiratory tract infection and a normal white blood cell count and differential. When she came in she would run up and down the hall and appear fine. This is a big differential point with children. If they look fine it is usually a viral infection. If they appear acutely ill it is usually bacterial.

It was described that she was delirious. This is unusual even with a 105°F temperature unless there has been some evidence of convulsive-like movements so this is a pretty sick child.

The right eardrum was dull and bulging and had an exudate behind it. With a purulent otitis the organisms are usually hemolytic streptococci, pneumococci or staphylococci, and should she have had an ear infection when she was given the penicillin you would have expected some improvement of the ear. If she had a purulent infection for a week you would have expected the bulging drum to have perforated. So this apparently was a real acute otitis. Usually if some condition is present such as rhinitis or pharyngitis enough to give an infection of one ear and if it has been going on for several days, both ears would be involved. Here the left ear was reported as normal.

She had bronchopneumonia. Her heart rate was 110 per minute. That is a normal heart rate for a child of 2½ years with no fever. With a temperature of 105° one would expect a heart rate of 160 to 170. So this is a bradycardia.

The extremities were found to be normal and there was no tenderness of the right arm although she had complained of pain in it several days before. Blood examination showed 12.5 grams of hemoglobin. This is probably still more evidence that this is an acute affair.

She was apparently well up until a week prior to admission and the white blood cell count was 6550 per  $\mu$ l although there was a

definite shift to the left in the differential. The urine was essentially normal.

Auralgan drops were put in both ears (apparently both ears were hurting the child, even though the left ear was described as normal). She had a cold which is the primer of most ear infections. Chloromycetin Palmitate was given. The antibiotic the physician is quite varied here with Aureomycin started the day before. Sponge baths and aspirin were given to lower the temperature.

The temperature on the day of arrival varied from 101.8° to 104.6°F and it remained elevated the following day. Bronchopneumonia was confirmed by roentgenography. The repeat count still showed a low white count and there was an increase in lymphocytes and in monocytes.

A cold agglutination test was negative. Usually it is the second week before cold agglutinations become positive. Brucellosis was considered. This disease is not as chronic as brucella infection. The child was apparently sick throughout the day, instead of appearing weak in the morning and better in the afternoon. An enlargement of the liver and spleen may occur in brucellosis, and there may be an encephalitis, which is the type of picture that the child had later on. Brucella agglutination usually becomes positive after about 10 days. So we are at the point here where it may or may not be positive.

*Salmonella typhosa* and *paratyphosa*—I think there are a number of things which go along with typhoid fever and I'll discuss this condition a little later. The agglutinations, according to the curve, are approximately 30 per cent positive at the time when the blood was drawn from this patient. Of course paratyphoid can produce a similar picture, although it is rather rare in the States.

The temperature rose to 105°F and the child developed a convulsion. Apparently it wasn't until the temperature was lowered to 99.8° that the convulsion stopped, and this appears to have been a febrile convulsion. Paraldehyde was given rectally, and it was noted that the second time paraldehyde was given on the next morning, there was a green, liquid stool. This was probably a result of the irritation of the rectum caused by the paraldehyde.

The child began having convulsions the following morning, the second hospital day. At that time the temperature was up to 106.4°. Luminal, 200 mg, was given in a 15 minute period. Ether by mask didn't help. It wasn't until a lumbar puncture was done that the convulsions ceased. I wonder if the temperature also went down at the time the convulsions ceased? If the lumbar puncture relieved it, you would think of some increase in intracranial pressure. It is very difficult in a 2½-year-old child to measure a spinal fluid pressure and I sympathize fully with the physician who was doing this. If the fever had gone down the convulsions may have topped because of this.

and instead of the lumbar puncture. The spinal fluid appeared clear and the findings in it were perfectly normal.

At this time Cantisin was given as well as 130 ml of blood, which was a supportive measure. The child had a hemoglobin of 12.5 grams per 100 ml and this would raise it a little more than a gram. Twenty milliliters of blood per kilogram of body weight increases the hemoglobin 3 grams.

The convulsive movements persisted. The child was aspirated and a plug removed. It was apparently thought that the child was in early shock and Aetheral gel was started. Again a small amount of blood was given for supportive treatment. As to how severe the convulsive movements were on the morning of the second day, it is a little hard to tell. If the child was in status for that hour and a half perhaps there was serious brain damage but if this was a matter of individual convulsions with twitchings that continued for that period of time one would not expect the child to suffer any degree of brain damage. One out of 14 children under the age of three, have convulsions with fever and many of them continue for an hour or more yet it is unusual to have brain damage.

Cantisin having been started now Chloromycetin was started with a dosage of probably about 50 mg per kilogram and some more blood was given.

Her face was edematous after two days of intravenous fluid therapy. The most common difficulty that would cause a child to become edematous is too much salt in the fluid which is given. In order to keep the cutdown open you must keep a flow of at least 6 drops per minute and that would amount to about 360 ml of fluid. She had previously received 100 ml of blood and this alone would give the amount of salt for her daily requirements. About a gram a day is all the salt a 2-year-old child needs. An accumulation of salt from the other fluids was probably the reason for this sign. The urine was checked daily for sulfa crystals and I imagine that it was checked for albumin particularly since the patient was edematous.

Two days later it was noted that she had some meconium-like stools. She had convulsed several times and may have bitten her tongue or her lip and had enough bleeding there to give a tarry stool if this was a tarry stool. The other things that are less common would be a Meckel's diverticulum or the swallowing of a foreign body. Usually you would expect bright red blood with a Meckel's diverticulum but it can be dark. A duplication of the bowel which is usually present in the small intestine with bleeding from a marginal ulcer could give tarry stools. Of course an ulcer could also give tarry stools. If the paraldehyde had irritated the rectum you would expect any evidence of blood to be brighter. Bleeding from ulcers in the ileum in typhoid fever could produce tarry stools but it is a lot more uncommon in children than it is in adults.

The temperature was down on the fifth hospital day. In a condition like typhoid fever, which I will discuss later, the temperature is usually elevated for at least a two- to three week period.

On the following day the liver was suddenly noted to have gone down four fingersbreadth, which indicates heart failure. Roentgenograms showed evidence of bilateral bronchopneumonia. There was no evidence of cardiac enlargement. This is hard to tell in a child and it is hard to evaluate that statement. As to the cause of the heart failure, the child still had the cutdown and an excessive amount of fluids can throw a child into heart failure. I have seen five children thrown into heart failure where it was obviously from fluids. They were usually six months old or younger and 500 ml of fluid in an hour could throw a perfectly normal six-month old infant into heart failure. But here is a child of 2½ years with kidneys in good condition. Could there have been a congenital heart disease? There is no evidence of any murmur and no cardiac enlargement so you would tend to discount those conditions with a large heart and no murmurs such as an aberrant left coronary artery or fibroelastosis. Could this be due to a myocarditis from an infectious process? The pneumonitis could have been quite severe, and typhoid fever could cause a myocarditis.

The following day the temperature spiked to 106°F. This is now about five days during which the child was apparently afebrile, and the heart failure, which I believe the condition is, has subsided to some degree with the liver gradually decreasing in size. I wonder why there is no mention of digitalizing the child, or of oxygen or other therapy.

She then vomited small amounts of apparently old blood. Any blood swallowed during the convulsions five days before certainly would not be expected to remain in the stomach long. Again the possibility of a high ulceration is present. The temperature remained high. The Gantrisin which had been given for a week or more was discontinued and Terramycin was started.

The patient still remained comatose. This is a period of seven or eight days. One thinks now of a progressive central nervous system disease. Rales continued in the lungs. The white count was still low. A child of 2½ years of age is able to respond very well to infection and with a purulent infection you would expect the count to have been high. The child now appeared spastic. This would point to progressive central nervous system disease.

And now the "fly in the ointment" a yeastlike fungus appeared in a throat culture. There are a number of fungus diseases which affect the central nervous system. Torulosis is the most common, but there is also saccharomyces, oidium, coccidioidomycosis, blastomycosis, sporotrichosis and actinomycosis. The symptoms of these usually depend on whether or not a granulomatous process was formed to cause obstructive signs and symptoms, or whether different

portions of the brain are involved. The spinal fluid findings usually are those of a meningitis, particularly with torulosis with high protein, low sugar and increased cells. The symptoms are not usually those of an acute infection. There is usually no fever with torulosis but when there is it is usually only up to 101°F. So this doesn't appear to be a fungus condition.

The following day the patient stopped breathing, the lungs contained rhonchi and she apparently had pulmonary pathology. The lumbar puncture done that day showed an initial pressure of 224 mm of water. Here is a child who is stuporous so that would be an accurate pressure. The pressure is normal up to 200, this is a little above. Blood chemistry studies again were normal and only one lymphocyte was present. The patient was more edematous and her abdomen was distended. She had been given positive pressure oxygen which could account for the distension of the abdomen. Then she died of a respiratory condition.

The picture then is that of an encephalopathy. This can occur with glomerulonephritis but wouldn't be expected to have persisted this long and there would have been abnormal urinary findings. In a child in coma with diabetes the urine would have showed sugar. Lead encephalopathy is something that has to be considered in every child. A child at 2½ years is at the nibbling stage and may have nibbled some of the paint off of her father's shoes if he was a painter. With the respiratory infection the lead may have been mobilized out of the bones into the blood. But central nervous system findings in a child which are severe enough to cause death are usually pretty striking. Usually the pressure is markedly elevated and may be up as high as 900 mm of water and the protein also is markedly elevated. There is no evidence of this in two taps. Other encephalopathies may be toxic or hemorrhagic and caused by pneumonia, dysentery, typhoid fever, typhus, scarlet fever (occasionally) and brucella.

I should like to talk a little more on typhoid fever. This is a possibility in this child. It produces a demyelinating encephalopathy. The child became spastic and this may have been what produced a lot of the findings. The stools are not loose although in a series of 252 cases reported by Holt and McIntosh<sup>1</sup> only one half had diarrhea. Half were found to have rose spots. These are easy to miss. Only 30 per cent of agglutinations are positive at the time that this agglutination was obtained, and this well may have been one of the 70 per cent that aren't positive. You would have expected to find a positive stool culture. The leukopenia and lymphocytosis would go along with typhoid as would the bradycardia which was present. The meconium-like stool if this was evidence of ulceration would go with typhoid fever and the myocarditis may have been the cause of the heart failure.

As to the most probable diagnosis we must go back to the ear infection. Here was a bulging drum and you get a mastoiditis with an

ear of this type, just as you get a sinusitis with a cold. Thus, a brain abscess must be considered. The sugar, chlorides, and proteins are normal, the globulin should have been up, and the blood cell count also would be up.

Doctor Hensler: I think the possibility of trichinosis might be considered. The child complained of pain in the arm, also the apparent involvement of the gastrointestinal tract, and the myocarditis would go along with this. I don't think that this is a very likely diagnosis, however, but it is something to be considered.

Dr. Borkin's diagnoses:

- 1 Brain abscess
- 2 Typhoid fever

#### PATHOLOGIC FINDINGS

Doctor Pierce: At autopsy the patient was a well-developed, well-nourished, female child appearing of stated age. There was moderate edema of the face and slight pitting edema of the legs. Small amounts of clear brownish fluid were found in the peritoneal and pleural cavities.

The scalp and meninges were generally very edematous. The brain weighed 1,150 grams, and there was marked edema throughout. The gyri were flattened, with narrowing of the sulci. No pressure cone was present. No other changes were evident grossly.

The heart showed no gross changes. There were scattered small areas of hemorrhage beneath the visceral pleura. Both lungs were markedly edematous and congested. There was no gross evidence of consolidation or of a pneumonic process.

The spleen was congested. The liver extended three fingersbreadth below the right costal margin at the midclavicular line. The liver weighed 970 grams. The parenchyma was pale pink and the lobules were grossly very prominent. There was marked edema.

The gastrointestinal tract was essentially normal throughout. No mucosal changes were found in any area. There was no lymphadenopathy.

The kidneys appeared grossly swollen. The right kidney weighed 135 grams, the left weighed 140 grams. The capsules stripped easily, revealing swollen and pale cortical surfaces. Throughout the cortical and medullary portions of both kidneys were many small, white tuberclelike formations measuring from 1 to 1.5 mm in diameter. There was marked edema of both kidneys. The findings were grossly similar to renal tuberculosis. Frozen sections done immediately, however, revealed them to be pyogenic abscesses.

---

\*Maj. Nester M. Hensler, USAF (MC), Chief Pulmonary Disease Service.

Microscopic examination of the lungs showed a generalized edema. A few scattered alveoli contained neutrophils, but no significant pneumonic process was found.

Sections of the brain showed generalized edema. Scattered throughout the cerebrum were focal areas of necrosis with leukocytic infiltration (fig. 1). The ganglion cells in some areas showed early ballooning degeneration. A few perivascular hemorrhages were found.

Examination of sections of the myocardium showed a very few small scattered abscesses (fig. 2). No other significant changes were evident.

Microscopic sections of the liver showed the majority of the hepatic cells to contain globules of fat. The cells were swollen and the sinusoids compressed. Mitotic activity was evident. Much granular brown black pigment, similar to hemosiderin, was noted in the Kupffer cells. The findings in the liver were interpreted as marked fatty degeneration, probably on the basis of a toxic process. No abscesses were found. The gastrointestinal tract, pancreas, spleen, and adrenals were not remarkable on microscopic examination.

The kidneys on microscopic examination showed multiple focal areas of necrosis, some rather large, with large numbers of neutrophils present (fig. 3). A few of the glomeruli showed epithelial crescents.

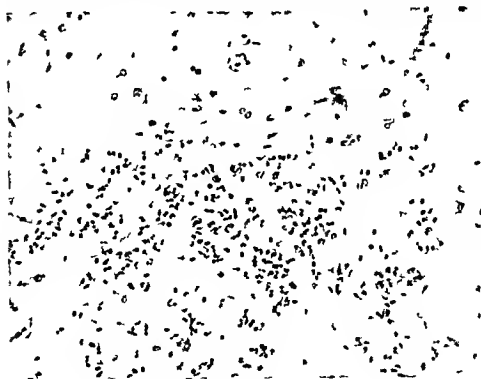


Figure 1. Microabscess in cerebrum. (Hematoxylin-eosin stain,  $\times 50$ )







Figure 4 Renal abscess containing fungus. (Gomori stain,  $\times 50$ )



Figure 5 High-power view of fungus (Gomori stain  $\times 215$ )

cents. The tubular epithelium showed necrosis and areas of calcification.

During the microscopic examination of the cerebral and renal abscesses in the hematoxylin and eosin preparations, chains of large organisms resembling hyphae were noted. Special stains showed gram positive, yeastlike fungus forms, with both hyphae and spore forms present in large numbers in the abscesses (figs. 4 and 5). The organisms were identified as *Candida albicans*.

The findings of systemic moniliasis has been reported with increasing frequency over the past several years. The infection usually has been in cases of chronic debilitating illness, which was not the circumstance in this case. This child had been ill for only three weeks and at autopsy was still well nourished.

The use of broad spectrum antibiotics has more recently been implicated in such cases and some have been shown to stimulate the growth of monilia in vitro. This is presumed to be the basis of this case. The child undoubtedly, as we have heard, originally had a respiratory infection with bronchopneumonia and otitis. Following the onset of the disease she received a total of six different antibiotics. It is presumed that the organism gained entry via the gastrointestinal tract which had probably been pretty well rid of its normal bacterial flora by the antibiotics.

I think that this well may be taken as a warning to us against the excessive use of combinations of antibiotics over any period of time.

#### Pathologic diagnoses

- 1 *Candida* mycethemia with multiple renal, cerebral, and myocardial abscesses
- 2 Marked fatty degeneration of the liver

#### REFERENCE

- 1 Holt L E Jr and McIntosh R. *Holt's Diseases of Infancy and Childhood*, 12th edition. Appleton-Century-Crofts Inc. New York N Y 1953 pp 1385-1389.

---

"Ferrous sulfate ingested orally, though giving a black or tarry color to the stools does not give a positive reaction with the gum guaiac test for occult blood.

The amount of blood contained in the stools of a patient who ingests an average portion of rare meat does not give a positive reaction to gum guaiac."

—JOHN COLLINS HARVEY, M D  
in *American Journal of Medical Sciences* p 19 July 1956

## SERVICE ARTICLES

# RESUMPTION OF MILITARY DUTY AFTER TREATMENT FOR TUBERCULOSIS

JAMES A. WIER *Colonel MC USA*  
CARL W. TRIMPEL *Brigadier General MC USA*

PRIOR to the use of chemotherapy in the treatment of patients with pulmonary tuberculosis relapse rates for those treated with bed rest were usually high. In a study of military patients with minimal tuberculosis inducted into service during World War II Waring and Roper<sup>1</sup> showed that the relapse rates varied between 30 and 70 per cent depending on the status of the disease and the type of military duty performed. In patients with more advanced tuberculosis the rate of "cure" or attainment of inactive disease was lower and the breakdown rate in these patients was high even under sheltered conditions. This unfavorable prognosis made it difficult to return any patient treated for pulmonary tuberculosis to military duty in a reasonable period of time. Although in the past a few selected individuals with minimal tuberculosis and with pleural effusion had been treated in the military service and returned to duty the usual practice had been to recommend permanent retirement for any individual found to have active tuberculosis.

The successful use of chemotherapy and operative procedures in the management of tuberculosis in the past decade reversed this trend and gave support to the contention that patients with tuberculosis might be treated and eventually returned to duty within the military service.<sup>2</sup> It has been the experience at this hospital that the relapse rate for military patients treated to the inactive stage of disease prior to discharge from the hospital was no higher than 5 per cent. It also was noted that in patients with new disease and with less advanced pulmonary tuberculosis a recovery rate of 90 per cent or higher could be attained with the same low eventual relapse rate. The active tuberculosis case finding program in the Armed Forces made such favorable results possible.

---

From Fitzsimons Army Hospital, Denver, Colorado. Trimpele is now Commanding General of Valley Forge Army Hospital, Philadelphia.

Presented at the meeting of the Section on Military Medicine, Scientific Assembly of the American Medical Association, New York, N. Y., June 1957.

The policy of separating from service all personnel with tuberculosis resulted in the loss of well qualified military manpower. In October 1949 the 81st Congress passed Public Law No. 341 which provided for temporary retirement of military personnel from the Armed Forces who were temporarily disqualified for active duty by disability. This law enabled the military services to retire the tuberculous patient to civilian life for a period of time up to five years. At the conclusion of this time or at any intervening period the individual could be returned to military service when found to be physically qualified. A number of military personnel were restored to an active-duty status by this means. However it was noted that many well motivated career officers and men who were temporarily retired to civilian life refused to re enter military service on recovery and conclusion of temporary retirement. While on retirement many of these men found good jobs in civilian life which made it difficult for them to sever these connections and re enter military service although they were well motivated while in the service. This loss was most critical to the Armed Forces when highly trained specialists failed to return to active duty. The cost to the Government in training these individuals was high. It has been estimated, for example, that the cost of training a highly skilled pilot of military aircraft was at least several hundred thousand dollars, and of some enlisted specialists as high as 15 to 20 thousand dollars or more. This investment by the Government was completely lost if these individuals did not return to duty. These same men with specialty training are the ones who upon retirement were best able to get well paying positions as civilians.

In view of the excellent results of treatment with low relapse rates, it was deemed possible to treat many military patients to a stage of inactive disease and return them to a duty status with only temporary limitations of physical activity. For this reason, in 1951 this hospital was authorized to return selected military patients directly to active duty. Initially only selected career personnel were returned to duty, particularly those showing a good response to treatment and with minimal residuals of tuberculosis. These trained specialists with definite value to the military service were given the option of a disability discharge or restoration to duty after an appropriate period of convalescent leave. It was considered necessary to give patients such a choice to make certain that every individual returning to duty sincerely wished to do so. Without motivation for service it would have been extremely difficult to evaluate the number of patients qualified to remain on active duty over a period of time, as the diagnosis of tuberculosis incurred in line of duty entitled them by law to Army retirement pay or compensation from the Veterans Administration when processed by a Physical Evaluation Board. These patients were returned to restricted duty under the limi

tations provided by the Army physical profile regulations. The profile code number "P3" excluded strenuous physical exertion such as might be required in combat or field training. These patients were qualified for overseas duty however, and by and large performed the general type of duties required of other soldiers on all but the most arduous type of assignment. Through the period of years since 1950 good results were maintained and better results accomplished by surgical treatment and newer drugs administered over prolonged periods. The estimated tuberculosis relapse rate continued at about 5 per cent and thus more patients were allowed to return to duty including those who were admitted to the hospital with advanced tuberculous lesions.

### RESULTS

Follow up of tuberculosis patients returned to military duty since 1952 has been undertaken at this hospital. During the period of 1952-1955, 293 patients have been returned to duty, recent follow up reports have been obtained on 261 (96 per cent) of those (table 1). Of the 261 patients followed, 233 (83 per cent) are still on active duty (table 2). Some of these have now been on duty 5 years, while those discharged to duty in 1955 have been on duty less than 2 years. During this same period of time 47 of the former

TABLE 1 *Patients treated for pulmonary tuberculosis and returned to active duty*

Year	Total number returned to duty	Lost to study		With follow-up data	
		Number	Per cent	Number	Per cent
Total	293	12	4	281	96
1952	32	1		31	
1953	62	0		62	
1954	93	4		89	
1955	106	7		99	

158 patients were returned to duty in 1956 increasing the present number in this category to 451 to date.

patients have been separated from the service 41 of these for reasons other than physical disability. Eleven have shown worsening of their disease. One is on temporary retirement because of an apparent recurrence of active disease (table 3). Five patients have been retired permanently for physical disability, 3 of these for nontuberculous disability, 1 because of tuberculosis and 1 for reasons unknown. Six of the relapses have occurred in patients discharged to duty in 1952, 1 of those patients received temporary retirement and is now back on duty status, 4 have been recommended for return to duty and 1 is in the hospital being

treated for active tuberculosis. Of the six patients returned to duty in 1952 who suffered relapses only one received more than six months of chemotherapy. The recurrence of disease in a patient who was returned to duty in 1955 is actually a nontuberculous condition. This patient had a difficult course during the time of original hospitalization with both tuberculous and non

TABLE 2 Follow-up data on tuberculous patients who returned to duty

Year	Total number followed	Still on duty		Relapse		Separated from service	
		Number	Per cent	Number	Per cent	Number	Per cent
Total	281	233	83	11	4	47	17
1952	31	18		6		11	
1953	62	51		3		11	
1954	89	74		1		16	
1955	99	90		1		9	

Some of those relapsed were also separated from service

TABLE 3 Type of separation from service of patients returned to duty after treatment of pulmonary tuberculosis

Year	Number separated from service	Nondisability discharge	Permanent physical disability	Temporary physical disability
Total	47	41	5	1
1952	11	9	2	0
1953	11	9	2	0
1954	16	14	1	1
1955	9	9	0	0

tuberculous complications following surgical intervention. He was rooperated on for a bronchopleural cutaneous fistula which reopened while he was on a duty status. The lesion proved to be due to a resistant staphylococcus, with no evidence of tuberculosis found at the time of the operation. Because of this patient's past history, however, he received another course of antituberculous drugs, and is now on convalescent leave prior to returning to duty again.

One hundred and fifty eight patients were returned directly to duty in 1956, increasing the total number of individuals in this group to 451. The follow up period of these patients has been too short for evaluation in this report. It is pertinent to point

out however that this figure reveals the current trend to restore more and more tuberculous patients to a duty status following successful treatment

Those patients separated from the service for reasons other than disability are still being investigated to find out the actual cause for termination of duty. Most were separated for administrative reasons such as completion of 20 or 30 years of service or termination of term of enlistment. All patients being retired from the service after leaving this hospital are being investigated to find the actual cause of retirement. This has been completed in some as mentioned above, but in a few instances the exact cause for physical separation is not known

Of the patients placed on temporary retirement and discharged with inactive disease to their homes or those transferred to the Veterans Administration for further treatment most have made excellent recoveries. After a period of one or two years of inactive disease most of these patients have been recommended for return to active duty which drops them from the Army retirement rolls if restoration to service is not accepted by the patient. Of 1,900 who have been given temporary retirement from the military service, 1,532 have been recommended for return to duty, 339 are still on temporary retirement, and 29 have been given permanent retirement for tuberculous or nontuberculous conditions. The relapse rate in this group of temporarily retired servicemen is 2.3 per cent at this time (table 4)

TABLE 4 Follow-up on military personnel temporarily retired for tuberculosis 1950-1955

	Total Number	Duty recommended		Continue on temporary retirement		Permanent retirement		Relapse	
		Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Total	1900	1532	80.6	339	17.8	29	1.5	43	2.3
Primary tuberculous	1383	1069		297		22		39	2.8
Primary nontuberculous	384	361		19		4		1	0.3
Other tuberculosis	133	102		28		3		3	2.3
Causes of relapse	Reasons included: tuberculous, non-tuberculous, temporary retirement, or permanent								

## DISCUSSION

In view of the generally excellent results of treatment for tuberculosis with modern day therapy and with the low relapse rate that has been evident in patients receiving adequate chemotherapy, it is our belief that it is not wise or economical to arbitrarily separate career motivated military personnel from military service when diagnosed as tuberculous. Experience over a five year period demonstrates that the return of these military personnel

to duty with only minimal restriction of their physical activities is entirely feasible. Retention of these individuals on active duty for periods in excess of two years has been accomplished in 83 per cent, with most of the remainder being separated from the service for administrative reasons. The rate of relapse of tuberculosis is extremely low—4 per cent in those followed to date. This demonstrates conclusively that the policy of returning the treated tuberculous patient to duty is practicable and that the danger of contagion to other military personnel is negligible. If these former patients are carefully and adequately followed a relapse is not necessarily a serious condition because in most instances it will be noted early, permitting successful retreatment of their disease and possible return to duty again.

Precise final data on results of this program will not be possible until a complete follow up study of at least five years has been accomplished on all patients returned to duty, and until the exact disposition of those discharged from the service is determined. It is the policy at the present time to request that chest roentgenograms of all patients returned to duty be sent to this hospital once yearly for comparison with previous films. It is believed that if the patient is asymptomatic on a duty status and shows no change in the chest roentgenograms, this will give us the desired proof of good health and the best practical follow up study for large numbers of individuals. In most of the former patients it will be possible to secure the results of bacteriologic studies which have been accomplished. In those patients on whom we have records indicating they are on a duty status (96 per cent with follow up reports), we have received and reviewed chest roentgenograms on approximately one half at this time. This was initiated only recently and it is our intention to do this once yearly for five years of follow up study.

Tuberculous patients, in general, have accepted their reassignment to duty after recovery in good faith and have taken overseas assignment without complaint. With the present program of increasing ambulation in the treatment of tuberculosis, it is anticipated that a higher percentage of our patients will be returned to duty in the future. The patients are being given part time work during their hospitalization periods and everything is geared toward eventual return to duty. These patients should be better fitted for duty on their return to service, as the philosophy of successful rehabilitation is being advanced to them from the beginning of hospitalization. They are assured that they are still on a duty status and will go back to active duty as soon as possible, and that this is a temporary physical setback like a broken leg or any other temporary disability. This optimistic concept favors the continuance of a military career and reduces the desire for retirement for disability reasons.



## SUMMARY AND CONCLUSIONS

A program of returning military patients to duty after treatment for tuberculosis included two groups of patients, the first being those restored directly to duty after treatment and the second group being those returned to active service after a period of temporary retirement.

During the period of 1952 through 1955, 293 personnel have been returned directly to duty after the successful treatment for tuberculosis. Of these 233 are still performing military duty as revealed in the 2 to 5 year follow up study. The relapse rate in these patients has been extremely low. Of the 11 showing recurrence of the disease 6 were discharged from the hospital in 1952. Forty one patients have been separated from the service for other than physical disability reasons and five have been given permanent retirement.

The follow up study of 1,900 military patients temporarily retired because of tuberculosis between the years 1950 to 1955 reveals that 81 per cent were found fit for duty after an average of 1 to 2 years of separation from service, and that only 2.3 per cent showed reactivation of the disease. Of the 1,383 patients treated for pulmonary tuberculosis 39 (2.8 per cent) showed a worsening of their disease during the follow up period.

In this day of highly technical armament the medical services of the Armed Forces must make every effort to conserve skilled military personnel, including those recovering from tuberculosis. In this report it has been shown that 80 per cent or more of tuberculous patients discovered reasonably early by an active case finding program can be rendered fit for return to military duty by modern day treatment. These results support the contention that it is feasible to treat most of the well motivated career military personnel to the stage of inactive disease and return them to useful service soon thereafter or following a short period of temporary retirement. The monetary savings to our Government by this program is very significant but more important members of the Armed Forces who develop tuberculosis in service can now almost certainly recover their health and live a normal life with little danger of recurrence of this chronic disabling disease.

## REFERENCES

1. Waring J. J. and Roper W. H. Minimal pulmonary tuberculosis in military personnel. *World War II Am. Rev. Tuberc.* 75:140 Jan. 1957.
2. Tempel C. W. and Wier J. A. Trends in management of pulmonary tuberculosis. *U. S. Armed Forces M. J.* 8:14-30 Jan. 1957.

# PSYCHIATRIC SCREENING OF COMBAT PILOTS CORRECTION OF THE RECORD

SAUL B SELLS *Pb D*  
DAVID A TRITES *Pb D*

**T**HE PURPOSE of this article is to correct factual errors and erroneous conclusions in an article by Sparks and Niess<sup>1</sup> which appeared in the June 1956 issue of this *Journal*. That article cited data from an unpublished report of the present authors<sup>2</sup> which has since been published.<sup>3</sup> Inasmuch as the conclusions stated by Sparks and Niess are based principally on our data, which are incorrectly reported and interpreted, and as we had no opportunity prior to publication, to read their paper, it is necessary to set the record straight. Their article has already been cited by two other authors,<sup>4, 5</sup> to our knowledge, who appear to have accepted their conclusions.

The particular conclusions and interpretations stated by Sparks and Niess, which are unsupported when the correct facts are used, are as follows:

1 That "psychiatric screening for combat duties, based on training level group psychologic test data and/or clinical appraisal as used in the project discussed here" appears as yet unable either to screen out the failures or to identify the successes in combat flying."

In their discussion of results, they stated "The results seem to indicate that the psychologists at training level understood neither the nature of combat stress and its effect on personality nor the psychic variables which constitute probable success or failure. The fact that their estimates were in significant disagreement with the estimates of both combat peer superiors and combat psychologists indicates that the hypotheses on which their predictions were made were *significantly*\*\* in error. It is important to note also that the predictions were made in the *opposite direction* \*\*\*

---

From Department of Medical Psychology School of Aviation Medicine U. S. Air Force Randolph Air Force Base Tex

This refers to our report<sup>2, 3</sup>

Italics added by authors

These extreme statements are based on correlation coefficients reported in our paper. The error consists in that positive relationships were interpreted as negative as a result of misinterpretation of the tables. For example, we reported a correlation of .43 between psychologists' ratings of pilots made in the combat situation and psychologists' ratings of the same men in training. The combat scale, however, was oriented with high numbers representing superior adjustment and the training scale, in the opposite direction with low numbers representing the positive end. Because of the reversed scaling of these two variables, a minus sign of the correlation coefficient denotes a positive relationship. It thus appears that the critics overlooked or misread the definitions of variables, which were included in the tables.

In support of the same conclusion Sparks and Niess' statement on page 813 with reference to the accuracy of training level prediction "Interestingly enough the top jet ace of the study (n double ace) was a predicted failure. The four failures \* were all predicted successes."

Although prediction of psychiatric failures in combat had been rejected as a primary goal of our research in favor of the broader concept of adaptability, principally because they are the result of stress in the situation as well as individual personality limitations \* the files for the ace and the four failures were checked for the ratings of their adjustment in training (no predictions of combat performance were made). No data were available for one of the failures, who had been included in the follow up sample because he had taken an experimental test battery. Of the remaining four the ace had been rated moderately well adjusted and two of the three failures poorly adjusted. The fourth had made a satisfactory adjustment in training. Thus the combat records correspond to training adjustment for three of the four men for whom data were available—not five misses, as reported.

The statistics quoted by Sparks and Niess reflect numerous errors with reference to numbers of cases on which various correlation coefficients were based. Their table 1 (p. 814) indicates that 14 coefficients reported were based on 65 cases whereas the actual numbers ranged from 38 to 45 cases.

2. That psychologists in the combat zone presumably because of better understanding can predict combat adjustment accurately. Sparks and Niess state on page 814 "The fact that the combat psychologists' estimates agreed in general with peer superiors' estimates indicates a most essential need for investigators in this area to have a realistic understanding of combat, since training researchers tended to predict successes to fail and failures

---

\* This refers to 4 out of 111 pilots located in the follow-up sample who were found to be actual psychiatric failures in combat.

*to succeed. The results support the hypothesis that predictions of combat proficiency, based on psychiatric data adequately oriented to combat, can be made with sufficient precision to be of value in screening "\*\*\*\**

This claim represents a further misinterpretation of facts. After making correction of the minus signs, the correlation coefficient between psychologists' ratings in training and the mean of the ratings of pilots in combat by their fellow officers and superiors (peer superior ratings) was 0.32 (significant at the 0.05 level) while that between ratings by psychologists in the combat zone and the mean peer superior ratings in combat was 0.78. However, *only the training ratings could be treated as predictions made independently of the combat peer superior ratings.* The ratings made by the psychologists in the combat zone were made with complete knowledge of the peer superior ratings and differed from them only because additional data were taken into consideration. Under the circumstances, they cannot be compared as predictors with the training data.

The combat ratings were specifically designed to reflect as complete knowledge as possible of combat performance because they were being collected as criteria for the purpose of validating training ratings (used as intermediate criteria) and experimental screening tests. Captain Sparks was a member of the group sent to the combat zone for this purpose and collected these data in accordance with the above mentioned procedure.

There is no evidence available in our study concerning the comparative skill in prediction of combat performance from the very early vantage point of the training situation and subsequent observation in the combat zone. Our data do present convincing evidence that *prediction is feasible from early observation.* The correlation of 0.78 is primarily of interest to demonstrate the consistency of our adaptability ratings in combat with the opinions of other pilots.

3. That certain personality types are suited to particular combat assignments. Sparks and Niess state, on page 815, that "some men with obsessive compulsive personalities did very well in B 29's, but none were seen to do well in fighters, conversely, a number of those with 'psychopathic personalities' did splendidly in fighters but were not seen to do well in bombers."

Although this statement is not presented in quantitative terms, it may give support to individuals searching for an authoritative quotation to bolster a particular position. Our data, while not conclusive because of small numbers and the low magnitude of the relationships, tend to support the conclusion that well adjust

ed anxiety free, motivated co-operative, and conforming individuals make the best military pilots. While there is much latitude for exceptions scientific discipline requires that the general trends should be given weight while further study should be aimed at the exceptions.

In view of the importance of the issues discussed in this study, the reader is urged to read the complete published report.\* It is our belief that every writer should be entitled to the free expression of his opinions. However, when factual data are presented in support of opinion the accuracy and validity of these data are the measure of credibility.

#### REFERENCES

- 1 Sparks B W and Nease O A. Psychiatric screening of combat pilots. *U S Armed Forces M J* 7 811-816 June 1956
- 2 Tritter D K and Sells S. B. Combat performance measurement and prediction. Unpublished paper presented at American Psychological Association San Francisco Calif Sept. 1955
- 3 Tritter D K and Sells S. B. Combat performance measurement and prediction. *J Applied Psychol* 41 121-130 Apr 1957
- 4 Mebane J C. *Neuropsychiatry for the Flight Surgeon*. Air University School of Aviation Medicine USAF Randolph Air Force Base Tex. Sept. 1956
- 5 Oasorio E D and Rigby M. K. *Thematic Apperception Test Response Patterns in the Prediction of Officer Success*. Technical Report No 7 Mar 1957 Neuropsychiatry Branch, Professional Division Bureau of Medicine and Surgery Department of the Navy ONR Contract N7008-40802 (NR 151-09)
- 6 Sells S. B. Development of personality test battery for psychiatric screening of flying personnel. *J Aviation Med* 26 35-45 Feb. 1955
- 7 Sells S. B. Further developments on adaptability screening of flying personnel. *J Aviation Med* 27 440-451 Oct. 1956.

---

#### WE WHO HAVE TAPE WORMS

The real editorial we refers to the annoying allusion to some nebulous and mysterious group of individuals in contact with the physician, when clearly he is working alone and has the prime responsibility for the patient. Could it be that a physician seeks to evade some responsibility for his patient through this device? Perhaps not but we wonder. Could not it seem appropriate in talking with patients to use other devices such as "It seems." It appears. I think. I believe. Mark Twain has been quoted as having said in effect "The editorial we traditionally and historically is reserved for the exclusive use of heads of state editors and people with tape worms. Anthelmintics—anyone?"

—R COLEMAN LONGAN Jr M D  
in *Virginia Medical Monthly*  
p 431 Sept 1957

# COMPARISON OF NAVAL OFFENDERS WITH NONOFFENDERS ON A PROJECTIVE SENTENCE COMPLETION TEST

BERNARD LOCKE *Commander* USC USNR

**I**N A PREVIOUS series of articles, the author and his colleagues<sup>1-4</sup> demonstrated that naval offenders present a far greater incidence of psychopathology than do nonoffenders. It is the purpose of this article to explore, through the use of a projective sentence completion test, some of the specific, dynamic areas in which offenders differ from nonoffenders.

Fifty prisoners at the Third Naval District Brig were given the Stein Sentence Completion Test.<sup>5</sup> They were asked to complete each sentence with a word or a phrase as rapidly as they could, as a test of how quickly they could think. With similar instructions, the same test was given to an equal number of men who were part of the transient population of the U. S. Naval Receiving Station, Brooklyn, N. Y., and who had no history of any naval disciplinary difficulties. The two groups were matched in regard to age, education, and length of service.

The completed tests were coded, mixed, and then presented in turn to three experienced clinical psychologists, who were asked to rate them in accordance with the instructions on the rating sheet (fig. 1). The judges were not advised as to the nature of the two populations, or even that two populations were represented in the 100 cases they were evaluating. After a preliminary pilot study, which showed no significant differences between the judges, their ratings were pooled. The results of these evaluations are presented in table 1.

It is seen that in every area the prisoner group scored higher—indicating greater disturbance—than did the control group. In five of the areas and in the general clinical impression, these differences were statistically significant. The greatest discrepancy lay in the prisoner's self concept concerning his abilities. Here 21 of the prisoners were rated as "2," severely dis-

---

From U. S. Naval Receiving Station, Brooklyn, N. Y. Dr. Locke is now at Veterans Administration Hospital, New York 10, N. Y.

Case No. \_\_\_\_\_

**INSTRUCTIONS** On the basis of your clinical judgment taking to account such factors as inappropriate responses, dysphoric references and manifestations of conflict rate the responses of the subject in the eleven categories listed below according to the following scale:

- 2 Severely disturbed. Subject appears to require therapeutic aid in handling emotional conflicts in this area.
- 1 Mildly disturbed. Subject appears able to handle emotional conflicts in this area without therapeutic aid.
- 0 No significant disturbances noted in this area.
- X Unknown. Insufficient evidence.

**RATING**

- \_\_\_\_\_ 1 Attitude toward family unit (parents, wife, siblings).  
 \_\_\_\_\_ 2 Attitude toward friends and acquaintances.  
 \_\_\_\_\_ 3 Attitude toward superiors.  
 \_\_\_\_\_ 4 Attitude toward inferiors.  
 \_\_\_\_\_ 5 Attitude toward peers.  
 \_\_\_\_\_ 6 Fears.  
 \_\_\_\_\_ 7 Guilt feelings.  
 \_\_\_\_\_ 8 Attitude toward own abilities.  
 \_\_\_\_\_ 9 Attitude toward past.  
 \_\_\_\_\_ 10 Attitude toward future.  
 \_\_\_\_\_ 11 Energy level.

General clinical impression? \_\_\_\_\_

Figure 1 Rating sheet for projective sentence completion test

TABLE 1 Comparison of mean scores of prisoner and control groups

Element rated	Prisoners	Controls	D	D/PE diff
Attitude toward family unit	1.33	1.29	+ .04	.11
Attitude toward friends and acquaintances	1.21	.92	+ .29	1.71
Attitude toward superiors	1.50	1.38	+ .12	.86
Attitude toward inferiors	.87	.48	+ .39	3.00
Attitude toward peers	1.19	.80	+ .39	3.54
Fears	1.36	1.79	+ .07	.54
Guilt feelings	1.43	1.13	+ .30	3.33
Attitude toward own abilities	1.34	.91	+ .43	3.58
Attitude toward past	.84	.65	+ .19	1.73
Attitude toward future	.96	.70	+ .26	1.44
Energy level	1.18	.80	+ .38	2.38
General clinical impression	1.64	1.34	+ .30	2.50

Significant at the .01 level of confidence

Significant at the .05 level of confidence

turbed as compared to 11 of the control group. Fifteen of the control group showed no evidence of any difficulty in this sphere, as compared to only 6 prisoners who rated a score of "0."

In addition to the apparent low regard that the prisoner had for himself, he also had considerable difficulty in his relationships with his peers and with his inferiors. Twenty of the prisoners received a score of "2" regarding their relationships with their peers as compared to only 9 in the control group with a similar rating, indicating that the prisoner was more maladjusted in this sphere. Similarly, 13 of the prisoners were rated as being severely maladjusted in their relationships with their inferiors, as contrasted with 5 individuals in the control group who were so classed.

These findings can be interpreted as indicating that the popular concept of the offender as being a narcissistic, self-centered individual is far from correct. The prisoner's self-devaluation is borne out by his projection of his own feelings onto his peers and those he considers his inferiors, and by the extent to which his relationships with these he clearly considers his superiors are affected. Further evidence for this concept is presented by the fact that the prisoner group showed a much greater disturbance in the area of guilt feelings than did the nonprisoner group.

In considering the data presented in table 1, the question may be raised as to why it is that the control group scored high in at least four of the areas under consideration: attitude toward family unit, 1.29, attitude toward superiors, 1.38, fears, 1.29, and guilt feelings, 1.13, as well as in the general clinical impression 1.34. It is impossible to answer this question without adding a matched group from civilian life for comparative purposes. A logical hypothesis appears to be that since all the men who were tested had volunteered for duty in the Navy, it is possible that their difficulties with the family and authority figures, and the resultant guilt feelings, may have led them to attempt to escape from their difficulties in civil life through enlistment.

Following completion of the original ratings, the three judges were told the nature of the groups which they had rated, but not that the groups were equal in number. They then were asked to separate the test protocols of the prisoners from the nonprisoners. One judge was correct in 70 per cent of his choices, the second in 68 per cent, and the third in 60 per cent. Combining the three evaluations, we find that in about two thirds of the cases it is possible to differentiate the naval offender from the nonoffender.

#### SUMMARY AND CONCLUSIONS

Fifty brig inmates and a matched group of 50 men in nondisciplinary status were given the Stein Sentence Completion Test.



in order to tap differences in areas of conflict. Blind evaluation of the test results made independently, by three competent judges revealed that the prisoner group apparently was more maladjusted than the nonprisoner group in all areas studied, and showed that there were significant differences in attitude toward inferiors in attitude toward peers in guilt feelings, and in energy level. It is believed that the low esteem in which the average prisoner holds himself, and the resultant difficulties in interpersonal relationships, play an important part in the development of delinquent behavior in the Navy.

The data suggest the possibility, which should be evaluated, that men volunteer for military duty because of maladjustment in family relationships, difficulty with authority figures, and exaggerated feelings of guilt and fear.

It is possible for competent clinicians to separate prisoners from nonprisoners on the basis of a sentence completion test, with considerably better than chance success.

---

**ACKNOWLEDGMENT** The author wishes to express his thanks to Dr Elias A. Abrams, Dr Irving Handelsman, and Dr Selig Rosenberg for their assistance as judges.

#### REFERENCES

1. Locke B. and Cornsweet A. C. Social personal history and naval offender. *U S Naval Bull* 49: 287-293 Mar-Apr 1949.
2. Cornsweet A. C. and Locke B. Alcohol as a factor in naval delinquency. *U S Naval Bull* 46: 1600-1603 Nov 1946.
3. Bromberg W., Apuzzo A. A. and Locke B. Psychologic study of desertion and release in Navy. *U S Naval Bull* 44: 358-369 Mar 1945.
4. Locke B., Cornsweet A. C., Bromberg W. and Apuzzo A. A. Study of 1063 naval offenders. *U S Naval Bull* 44: 73-86 Jan 1945.
5. Stein M. J. Use of sentence completion test for the diagnosis of personality. *J Clin Psychol* 3: 47-56, Jan. 1947.

---

Recognition of combined AB and Rh hemolytic disease of the newborn is clinically important inasmuch as transfusions of group A or B blood may aggravate the hemolytic process in such infants. Neutralized group O Rh negative blood is preferable for treatment of these patients.

—J. H. GUNSON, M. B., Ch. B.  
in *American Journal of Clinical Pathology* p. 40 Jan 1957

## Duplication of the Small Intestine

## A Cause of Neonatal Intestinal Obstruction

PAUL A THOMAS, *Captain MC USA*  
 KENNETH B BOVILLA, *Captain MC, USA*  
 WARNER F BOWERS *Colonel MC USA*

**D**UPLICATION of the gastrointestinal tract is an infrequent entity, as judged from the number of recorded cases.<sup>1,2</sup>

As an etiologic cause of intestinal obstruction in the newborn infant, this congenital anomaly is rarely encountered, the majority of cases are the result of atresia, stenosis, or malrotation.<sup>3,4</sup> For the treatment of a patient with neonatal intestinal obstruction requiring surgical correction, a specific etiologic diagnosis is desirable when such is obtainable. The presence of a palpable, freely movable, cystic abdominal mass at birth, with symptoms of intestinal obstruction, is presumptive evidence of a duplication of the bowel as the underlying cause. Two patients recently treated at this hospital illustrate the above combination of circumstances which led to a correct pre-operative diagnostic impression. The second case is of further interest because of the associated volvulus of the duplication segment and complete 2 mm atresia encountered at the proximal end of the lesion.

Duplications of the alimentary tract have been described in the literature under a variety of names: enteric cyst, enterogenous cyst, ileum or jejunum duplex, and giant diverticulum.<sup>1,5</sup> These lesions have been reported to occur along the entire course of the alimentary tract from the tongue to the rectum.<sup>6</sup> This entity, however, has been most commonly observed in the small intestine.<sup>1</sup> Usually symptoms appear in infancy or childhood, although occasionally the lesion does not become symptomatic until later in adult life.<sup>2,7</sup> The symptoms most frequently observed are those of partial or complete intestinal obstruction. Rarely is the symptomatology of sufficient severity to attract attention in the first week of life. The youngest patient in the series reported by Ladd and Gross<sup>8</sup> was 2 weeks of age. In Kirtley and Matuska's<sup>9</sup> tabulation of all reported cases of enterogenous cyst of the duodenum, none was clinically evident with-

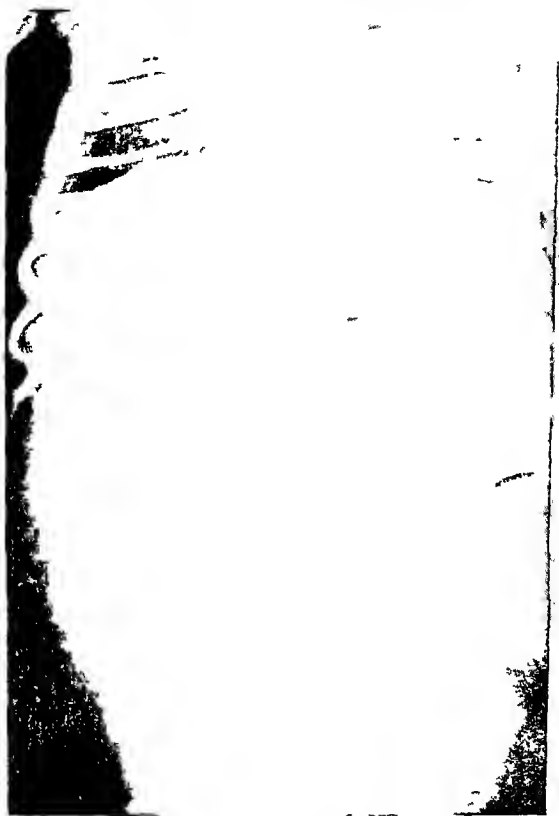
in the first week of life. In a review of acute abdominal conditions occurring in infancy, Norris and Braxton<sup>3</sup> did not list duplication as a cause of intestinal obstruction. Wilson,<sup>4</sup> on the other hand, encountered three newborn infants with obstructing duplications in a series of 57 who were operated on for congenital abdominal lesions. In two instances a duplication of the small intestine was associated with volvulus about the involved segment. In one of these a proximal atresia was described, similar in nature to the pathologic findings of the second case herein reported.

### CASE REPORTS

**Case 1** This baby girl was born 29 April 1956 after an uncomplicated gestation and delivery. Physical examination at that time revealed a freely movable cystic mass 2.5 cm in diameter palpable in the right lower abdomen. During the first several days of life, the infant had two dark-green stools. By the fourth day, however, persistent vomiting after each feeding was observed. Physical examination at this time confirmed the presence of an abdominal mass; the abdomen also was slightly distended and bowel sounds were high pitched. A roentgenogram of the abdomen (fig. 1) was consistent with early mechanical intestinal obstruction.

On the fifth day of life the infant was operated upon for an obstructing duplication cyst of the ileocecal valve (fig. 2). The lesion presented on the inferolateral aspect of the distal ileum and cecum away from the mesentery. The cyst was incised to aspirate about 30 ml of clear yellow fluid and relieve the extrinsic pressure obstruction of the ileum. The cyst wall was then partially excised, leaving the contiguous wall along the ileum and cecum undisturbed. Postoperatively the patient recovered without incident and when last seen at several months of age was doing well. Pathologically, the wall of the cyst, smooth muscle, was lined by colonic type mucosa.

**Case 2** This baby boy was born 1 July 1957 after an uncomplicated gestation and delivery. Physical examination at that time revealed a 4 by 6-cm freely movable, cystic mass palpable in the left lower abdomen. An unusually large amount (125 ml) of gastric content was aspirated by catheter. For several days the infant appeared to do well and two small dark-green stools were passed. By the fourth day persistent gastric retention and vomiting were observed. Physical examination at this time confirmed the presence of an abdominal mass which transilluminated light. Bowel sounds were present but markedly decreased on auscultation. Deepening jaundice also was noted but considered physiologic. Microscopic examination of meconium did not show the presence of any desquamated cells or debris. A roentgenogram of the abdomen (fig. 3) was consistent with a mechanical intestinal obstruction. On the fourth day of life the infant was operated upon for an obstructing duplication of the jejunum (fig. 4). A volvulus



*Figure 1 (case 1) Preoperative roentgenogram revealing moderate gaseous distension of the stomach and small intestine compatible with early intestinal obstruction*

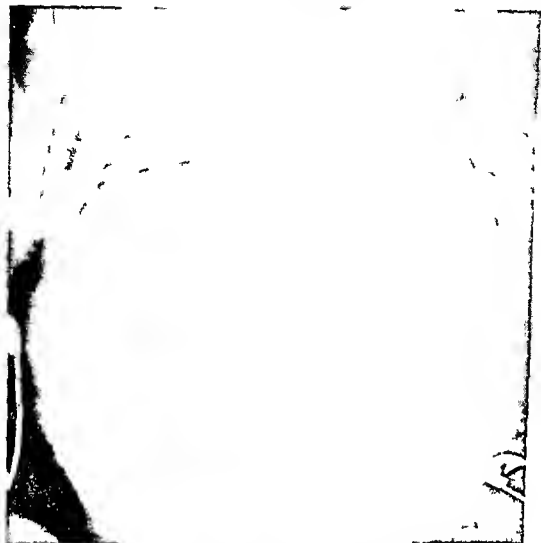


*Figure 2 (case 1) The exposed ileocecal region at operation. The duplication cyst is evident on the antimesenteric aspect with the appendix lying on the surface. The proximal ileum is moderately dilated.*

of the involved segment was reduced and on further inspection a 2 mm fibrous atresia was observed at the proximal base of the pathologic segment. Resection of the jejunum to include the duplication and atresic bowel with end-to-end anastomosis was performed. The postoperative recovery was complicated by a superficial wound breakdown which was allowed to heal by secondary intention. The baby is presently doing well. Pathologically the wall of the cyst smooth muscle, was lined by small intestinal type mucosa.

#### DISCUSSION

The gross pathologic characteristics of these lesions have determined the various corrective surgical measures employed in the past. The intimate association of the smooth muscle wall of the contiguous normal channel with that of the enteric cyst makes simple enucleation extremely hazardous. Frequently the lesion is situated between the leaves of the mesentery, with the vascular supply to the normal bowel coursing over the cystic mass. This further complicates any attempt at enucleation. Therefore, the ideal surgical treatment is extirpation by resection of the involved segment and reestablishment of intestinal continuity by anastomosis. Where resection has not been technically feasible, marsupialization of the cyst, either into the gastrointestinal tract or to the exterior, has been accomplished with satisfactory results.



*Figure 3 (case 2) Preoperative roentgenogram revealing moderate gaseous distension of the stomach duodenum and proximal jejunum compatible with complete intestinal obstruction*

The first case was unusual in that the duplication was anti-mesenteric and did not involve the blood supply to the normal bowel. Therefore, it was treated by partial excision of the duplication, leaving the area of contiguous attachment between the cyst and normal bowel undisturbed. The narrow strip of mucosa exposed to the peritoneal cavity was not cauterized or otherwise treated. This decision is justified on the basis that experimentally various intestinal segments have been isolated and turned inside out in the peritoneal cavity to absorb excessively produced fluid, as in ascites, without harmful effect.<sup>6</sup> This infant did well following surgery.

The second patient, on the other hand, exhibited the more characteristic finding of a duplication cyst presenting between the leaves of the mesentery. In this instance the mesentery was sufficiently redundant to allow a volvulus of the pathologic



*Figure 4 (case 2) The exposed jejunum at operation. The duplication cyst is evident between the leaves of the mesentery with the blood vessels coursing over the surface. The collapsed jejunum is noted over the outer aspect of the cyst.*

segment to occur. The presence of a concomitant atresia was interesting. In retrospect the high level, complete intestinal obstruction was responsible for the unusually large volume of gastric aspirate obtained at birth.

#### SUMMARY

Two cases of duplication of the small intestine with signs and symptoms of intestinal obstruction within the first week of life are reported. The presence of a palpable, freely movable, cystic abdominal mass at birth is presumptive evidence of a duplication cyst of the gastrointestinal tract. The first case was unusual in that the ileocecal duplication presented on the antimesenteric aspect of the bowel. This circumstance is favorable for a simple, partial excision of the cyst wall without disturbing continuity of the normal intestinal tract. Such was the treatment in this patient. The second case was complicated by the surgical observation of volvulus of the involved segment as well as a concomitant atresia of the jejunum at the base of the duplication. In the majority of infants with gastrointestinal

duplication surgery may be deferred until a time of election, however, in the presence of intestinal obstruction, as observed in these two newborn infants, surgical correction becomes urgent

# REFERENCES

- 1 LoPresti J M Kaufman P and Hawfield H H Duplication of alimentary tract *Clin. Proc Child. Hosp* 6 357 361 Nov 1950
- 2 Kirtley J A and Mataska R A Enterogenous cyst of duodenum *Ann. Surg* 145 265-268 Feb 1957
- 3 Norris W J, and Brayton D Acute abdominal conditions of infancy and childhood: summary of present concepts of early diagnosis *J. A. M. A.* 145 945-950 Mar 31 1951
- 4 Wilson M C Abdominal surgery in newborn *Surg. Gynec. & Obst.* 100 141 148 Feb 1955
- 5 Ladd W F and Gross R F Surgical treatment of duplications of alimentary tract: enterogenous cysts, enteric cysts or ileum duplex *Surg. Gynec. & Obst.* 70 295-307 Feb (No. 2A) 1940
- 6 Neumann C G Braunwald N S and Hinton J W Absorption of ascitic fluid by pedicled flap of intestinal mucosa exposed within peritoneal cavity *Plast. & Reconstruct. Surg.* 17 189-195 Mar 1956

## ARE YOU READY FOR SPACE TRAVEL?

Science fiction has provided us with extraordinary ideas about the physiology of space man but in the United States many individual scientists, government agencies and private organizations are studying the problems which man will have to contend with if and when he leaves the earth for outer space or even tries to fly at very great heights and very great speeds. It has been claimed by one physiologist that man will be ready for space travel as soon as space ships are ready and that this will be sooner than most people suspect. This seems an overoptimistic view but the investigations to determine whether it is possible are being carried out in the United States with increasing tempo.

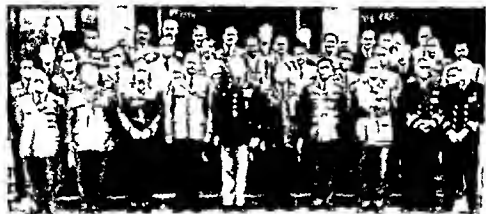
—“Current Comment” Section  
in *Medical Journal of Australia*  
p. 329 Aug. 31, 1957



## Departments

### MEDICAL OFFICERS RECEIVE AWARDS AT ANNUAL MEETING OF MILITARY SURGEONS

Medical officers of the military services shown on these pages received the highest scientific awards at the 64th annual meeting of the Association of Military Surgeons held in Washington D C 28 30 October under the presidency of Colonel Amos R Koonitz MC Maryland National Guard



Shown above are most of the seventy four officers from other countries who attended the meeting. Colonel Koonitz is in the center of the first row. On his left is Major General Paul I Robinson MC USA Executive Director of the Dependents Medical Care Program. Colonel George B Green USAF (MC) was chairman of the Foreign Liaison Committee.



Colonel Charles R. Mueller MC USA (retired) above Director of Medical Service Department of Medicine and Surgery Veterans Administration was installed as president of the Association at the close of the 1957 meeting.



Brigadier General Carl W. Tempel MC USA left Commanding Officer of Valley Forge Army Hospital was the winner of the Stitt Award for merit to 1957 achievement in the use of antibiotics in the treatment of tuberculosis. He was given the award by Dr Jerome J. Van Gasse General Manager of Pfizer Laboratories Division, Charles Pfizer & Co. Inc.



Assistant Secretary of Defense Dr. Frank B. Berry right was the moderator of a panel on "Medical Education in the Federal Services" which included Dr. John C. Hunemaker Veterans Administration Dr. James A. Shannon Director National Institutes of Health Rear Admiral B. W. Hogan Surgeon General of the Navy Dr. Leroy E. Burney Surgeon General of the Public Health Service Major General Silas B. Hays Surgeon General of the Army Major General Dan C. Ogle Surgeon General of the Air Force

Colonel John P. Sharp USAF (MC) right is shown receiving the Gorgas Medal from Mr. Herbert W. Blades President of Wyeth Laboratories sponsor of the award. The medal was given for outstanding contributions to preventive medicine through deceleration studies



Major General Paul I. Robinson MC USA left general chairman of the 64th annual meeting of the Association receives the Founder's Medal from Colonel Koontz.



Captain William W. Ayres MC USN Armed Forces Institute of Pathology won the Sir Henry Wellcome Medal and Prize

## DR DEARING NAMED HEALTH DIRECTOR IN OFFICE OF DEFENSE MOBILIZATION

Dr. W. Palmer Dearing, formerly Deputy Surgeon General of the U. S. Public Health Service, has been appointed to the newly created position of Assistant Director for Health in the Office of Defense Mobilization Executive Office of the President by Gordon Gray, Director of Defense Mobilization. Mr. Gray formerly was Secretary of the Army and later Assistant Secretary of Defense for international security affairs.



*Dr. W. Palmer Dearing*

Dr. Dearing, a *cum laude* graduate of Harvard Medical School in 1931 and of the Harvard School of Public Health, has been a Public Health Service career officer since 1934. He served as an epidemiologist in studies of poliomyelitis in California from 1934 to 1936 and tuberculosis from 1936 to 1941. In 1941 he was assigned to the Office of Civilian Defense as assistant and subsequently chief medical officer. In 1944 he was named personnel chief of the health division, United Nations Relief and Rehabilitation Administration. He returned to Public Health Service headquarters in 1945 as Deputy Chief of the Division of Public Health Methods

and a year later was named Chief of the Division of Commissioned Officers, in which post he undertook a complete overhauling of policies for recruitment, training, and assignment of officers.

Named the Deputy Surgeon General of the Public Health Service in May 1948, Dr. Dearing was the third officer to hold that position since the creation of the position by the 76th Congress in 1939. He is a native of Palo, Iowa, but received his early schooling in California and Washington, graduating from Washington State College in 1927. He was a member of the founder's group of the American Board of Preventive Medicine, a fellow of the American Public Health Association, and a former member of the House of Delegates of the American Medical Association.

## A MESSAGE FROM THE A

In 1956 the Secretary of Defense gave active the elimination of the Veterinary Corps in the Army. More recently, by administrative action Secretary Wilson informed the Secretaries of the Air Force that inspection and grading services for subsistence items of animal origin in the United States and Hawaii were to be transferred to the Department of Agriculture as promptly as is mutually agreeable to the Army and the Secretary of Agriculture. Similar work in connection with food borne diseases is to be transferred to the Department of Agriculture.

With the transfer of inspection and grading services for subsistence items and laboratory work in connection with food borne diseases and animal diseases, the Secretary of the Army was given 60 days in which to negotiate and approve an agreement with the Secretary of Agriculture for performance of those functions. In addition, the Army and Air Force are to develop plans and test the performance of depot, post, camp, and station inspection activities by the Department of Agriculture.

In support of the action, the Secretary of Defense indicated that it is in the overall interest of the Government for his Department to utilize the extensive and specialized resources of the Department of Agriculture in the subsistence inspection area. At the time the directive was issued, the Department of Agriculture already was performing one third of the inspection functions for the Department of Defense. The Secretary said that his action would eliminate divided responsibility and centralize the entire function in the Department of Agriculture by transferring the remaining two thirds. It is estimated that such action will result in a saving of 100 officer spaces and 500 enlisted spaces.

Orderly and equitable disposition of veterinary personnel, under the terms of the directive, is to be made by release from active duty, transfer, or reassignment. Commissioning and activating reserve veterinary personnel after 1 October 1957 is not authorized except where necessary in the judgment of the Secretaries of the Army and Air Force to prevent inequities.

In a report to the Board of Trustees in May 1956, the Council on National Defense pointed out that the Congress legislated to

From the Council on National Defense of the American Medical Association. The views and opinions expressed are not necessarily those of the Department of Defense.  
—Editor

establish the Army Veterinary Corps in the National Defense Act of 3 June 1916 and reaffirmed its action in the Army Organization Act of 1950. Further, the United States Air Force recognized the military necessity for a veterinary service and administratively established a Veterinary Corps in 1949.

The Council recommended that the American Medical Association vigorously oppose any action by the Department of Defense that would reassign, discontinue, or obtain through contractual arrangement the various functions performed by the Army and Air Force Veterinary Corps. In recommending this action, the Council recognized that military veterinarians have made and continue to make valuable contributions to medical science of both military and civilian significance. Military veterinarians have played a vital role in successfully protecting military personnel from food borne and animal diseases throughout two world wars and the Korean conflict, and have been responsible for inspection of food used by the Armed Forces.

The professional capabilities, military training, and centralized control of the Army and Air Force Veterinary Corps have established them as indispensable components of the over all preventive medicine program and as important paramedical elements in the event of atomic disaster. The officers of this corps, trained and being trained in radiobiology, radiotoxicity, and radioassay as these pertain to foodstuffs and food producing animals subjected to the effects of nuclear detonation, comprise a group whose technical knowledge and capabilities will be of inestimable value to both military and civilian populations in the event of atomic disaster. Such a group would be difficult of replacement.

Officers of the Army and Air Force Veterinary Corps, having been trained in the medical care of human casualties, should be relied upon to assist medical officers in the event of atomic disaster. The elimination of military veterinarians will substantially increase the Armed Forces requirements for medical officers to assume many of the functions performed by the veterinarians, thereby reducing the number of physicians available for the medical care of the civilian population.

For these reasons, the House of Delegates of the Association, in June 1956, voted to oppose the elimination of military veterinarians.

On 16 October 1957, the Association sent a letter to Secretary of Defense Neil H. McElroy outlining the action previously taken by the medical profession on this subject and requesting that in light of the responsibilities of the Secretary of Defense for the health of the personnel of the Armed Forces under their world wide missions at world wide bases he carefully reconsider the 1 October directive, which in effect abolishes the military Veterinary Corps.

# OFFICERS CEI

Su,

The following re  
tified by the board  
previous 194000 of  
the Office of the S  
ices

Americ

George J Austin Maj USAI

Am

Deck E Chandler Lt Comd

George C Hamill Capt USAI

Americ

Anthony A Boraski Maj USAI

American Board of Intern Medicine

Nicholas F Coste Maj USAI

Michael P Daquisto Maj USAI

American Board of Preventive Medicine

Aviation Health

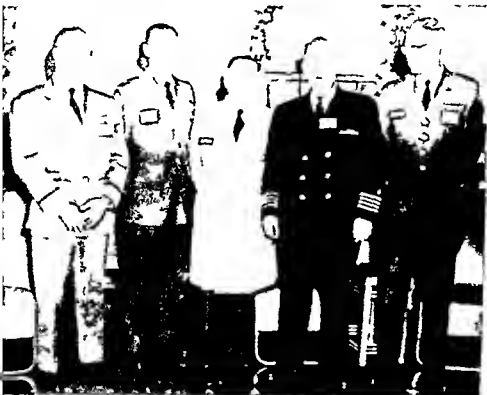
Wilbur L Jencyer Jr Col USAI

## DEATHS

BAKER Maude Myrtle, Captain, AM 1, USAI, of Lake Charles, La stationed at the U S Army Medical Center, Ryukyu Islands graduated in 1940 from Xavier University, New Orleans, La commissioned a Second Lieutenant in the Army of the United States 11 March 1941, arriving on active duty from 16 March 1943 until 16 February 1944, then on active duty 22 October 1944 died 10 September 1951, age 41, at Okinawa, Ryukyu Islands, of acute leukemia

REEVES, James Aul, Lieutenant, MC, USAI, of San Mateo, Calif stationed at the U S Naval Hospital, Oakland, Calif graduated in 1941 from the University of Southern California School of Medicine, Los Angeles Calif served in an enlisted status from 21 November 1944 until 21 August 1945, promoted to Lieutenant (junior grade), MC, USAI, in June 1949 and served from that date until his release in inactive duty 13 September 1952, ordered to active duty 6 July 1954, died 5 September 1954, age 42, at the U S Naval Hospital, Oakland, of pulmonary embolism

## OFFICERS ATTEND PREVENTIVE MEDICINE CONFERENCE AT FORT CARSON, COLORADO



Speakers at a recent preventive medicine conference devoted to streptococcal infections at the U S Army Hospital Fort Carson Colo included (left to right) Lt Colonel Charles N Moss USAF (MC) Office of the Air Force Surgeon General Lt Colonel Herschel E Griffin MC USA Chief Communicable Diseases Branch Office of the Army Surgeon General Colonel James L Murchison MC USA Commanding Officer of the Fort Carson hospital Captain John R Seal MC USA head of the Communicable Disease Control Branch Office of the Navy Surgeon General and Lt Colonel Richard H B Dear MC USA Post Surgeon Fort Sheridan Ill

Sixty Army Navy and Air Force Medical Corps officers and civilian physicians attended the conference

## WALTER REED CARDIOLOGIST PROMOTED



*General Mattingly*

Brigadier General Thomas W. Mattingly, MC USA chief of the department of medicine at Walter Reed Army Hospital and consultant to the White House physician was promoted on 1 November from the grade of colonel. General Mattingly is a native of Annapolis Md and 1930 graduate of Georgetown University Medical School where he holds the appointment of clinical associate professor of medicine.

## Fort Benning Hospital Inspected

Dr Varner J Johns Jr chairman of the department of medicine College of Medical Evangelists and Dr Harold A Zintel director of surgery St Lukes Hospital New York City consultants to the education and training division of the Army Surgeon General's Office recently visited the U S Army Hospital Ft Benning Georgia to review the intern training program established last summer. They also conducted a survey to determine if the residency program should be expanded to include other specialties in addition to training in general surgery which has been offered for the past six years. Colonel Robert B Skinner is commanding officer of the hospital.

---

ERRATUM On page 1541 of the October 1957 issue of this *Journal* in the section entitled "Officers Certified by Specialty Boards," the last three medical officers listed should have been shown as certified in "Occupational Medicine" rather than in "Founders Group in Occupational Medicine." The *Journal* regrets this error — Editor



## PHONOGRAPH RECORDS AID TEACHING

The Indiana University School of Dentistry and the University of Pennsylvania School of Dentistry for the first time in any dental school as far as it is known are making available to their students and faculty a new technic in dental education. Outstanding clinicians of the country are brought to the classroom and library where a "clinics on record" collection is established. These records are available to the practicing



*Dr. Maynard A. Hine, Dean of Indiana University School of Dentistry, center; Dr. Ralph E. McDonald, Chairman of the Department of Dentistry for Children, seated; and Dr. Arthur Klein, a member of the children's department faculty, listening to Dr. McDonald's "clinics on record" in the library of the dental school.*

dentist in his home through the medium of his phonograph. "Clinics on record" makes distance from clinical instruction centers no longer a barrier to learning new techniques. Not intended to replace clinical participation but to supplement it, the method should prove helpful to many dentists who find it impossible to attend every clinic they should attend.

## CORRESPONDENCE

### Tuberculosis of the Liver

*To the Editor* —In my opinion the abstract "Primary Military Tuberculosis of the Liver" on page 1,357 of the *U S Armed Forces Medical Journal* for September 1957, should not have been published. This is an abstract of an article by the same title by Terry and Gunnar published in the *Journal of the American Medical Association* of May 11 1957. To any pathologist the concept of primary military tuberculosis of the liver is untenable. Terry and Gunnar in their original article freely admit that "Primary tuberculosis of the liver" is inaccurate because the condition is invariably secondary to tuberculosis elsewhere. As a matter of fact they devote half a page in the *J A M A* to an apology for and an explanation of what they mean by the term. They admit that they use it for reasons of convenience. In my opinion their arguments in favor of the title are weak and indefensible. The abstract published in your Journal gives no inkling of this and therefore it is misleading.

JOHN H. SCHAEFER M D  
525 South Flower Street  
Los Angeles 17 Calif

*The above letter from Doctor Schaefer was sent to Doctors Terry and Gunnar who made the following comment:*

*To the Editor* —Although we are more interested in the diagnosis and cure of primary military tuberculosis of the liver than in its pathology or semantics we sympathize with Doctor Schaefer distress at our use of the words "primary" and "tuberculosis" in the title of our article for he is a pathologist and so a pathologist (as so ourselves) primary tuberculosis can only mean one thing. We thought however that we had made it clear that "primary" referred to "military" rather than to tuberculosis and that "primary military tuberculosis of the liver" was therefore justified. We should also like to point out that no matter what name is used it is necessary to recognize military tuberculosis confined to the liver as an important cause of fever of undetermined origin which is readily diagnosed by needle biopsy of the liver and gratifyingly responsive to treatment with isonicotinic acid hydrazide—but diagnosis and cure are both unlikely unless this rather occult situation is kept in mind.

R. BARRATT TERRY M D  
ROLF M. GUNNAR M D  
Cook County Hospital  
Division of Medical Education  
720 South Wolcott Street  
Chicago 12 Ill

### Dental Water Turbine Handpiece

To the Editor—We have received a copy of the September 1957 edition of the *United States Armed Forces Medical Journal*. Please be advised that there is an error in the article by Commander Frank J. Brauer titled "Increasing Dental Speeds" starting on page 1291. On page 1292 under "Water Turbine Handpieces" there appears a statement as follows: "A water turbine (hydraulic) handpiece developed at the University of Michigan operates at about 60,000 r.p.m. The water turbine (hydraulic) handpiece was developed by Dr. R. J. Nelson, Mr. C. E. Pelander and Mr. J. W. Kumpula at the Dental Research Section, National Bureau of Standards and not at the University of Michigan as stated. Reference to the article cited by Commander Brauer will show that the handpiece developed at Michigan was air driven and not water driven. Your assistance in clarifying this matter will be appreciated.

JOHN W. STANFORD  
Research Division  
National Bureau of Standards  
Washington 25 D C

Mr. Stanford's letter was referred to Commander Brauer who replied as follows:

To the Editor—I find that I erroneously listed the air turbine handpiece developed at the University of Michigan as a water turbine instrument. Proper due credit for the water-turbine instrument with the turbine in the head of the instrument belongs to the Research Section, National Bureau of Standards. Thank you for your kind attention to this matter.

FRANK J. BRAUER, Commander, DC, USN  
U S Naval Station  
Navy No 27  
c/o Postmaster Seattle Wash

### Dental Courses Announced

A five day dentistry work shop will be conducted by the Sterling Rock Falls Rehabilitation Center in Rock Falls, Ill. 26-30 January 1958 immediately preceding the mid winter meeting of the Chicago Dental Society. The course will cover prosthetic restorations of the ear, nose and parts of the face using both hard and flexible prostheses. During the month of August 1958 another course will be offered in the theory and technique of maxillofacial surgical, orbital and cleft palate care. Additional information may be obtained from Edwin N. Cooper, Executive Director, Sterling Rock Falls Rehabilitation Center, 303 W. 2nd Street, Rock Falls, Ill.



# Index to Volume VIII

## Subjects

**ABNORMALITIES.** See also under specific  
organ and region  
atrial septal defects hypothermia in  
closure of 84  
colon sigmoid redundancy of 1303  
congenital atresia of common hepatic  
duct and cirrhosis (CPC) 1350  
congenital dermal sinus and cyst of  
posterior fossa 165  
development and Maldegaard's deformity in  
9-year-old girl 1527  
small intestine duplication of as cause  
of intestinal obstruction 187  
testicular epistasis 1046  
transverse aberrant testicular maldescent  
1046

### ABSCESS

epidural intracranial abscess caused by  
orthorotavirus infection 120  
of lung 1275  
ovarian complicating pregnancy 1664  
renal cortical and myocardial and  
candida mycetozoa (CPC) 1801

### ACCIDENTS

trauma and eating habits of pilots 942  
aircraft pilot survival measures of Flying  
Train and Air Force 937  
accident effect on and prevention on  
1603  
development in parachuting 1363  
motor vehicle prevention program 1180

### ACNE

vulgaris 1135

### ACTINOMYCOSIS

of mandible 1214

### ADAMS SAMUEL

Revolutions of American surgery and dentistry  
625

### ADDRESS

at dedication of DeWitt Army Hospital  
(Hays) 1375  
at dedication of Ireland Army Hospital  
(Hays) 866  
at San Francisco meeting of American  
College of Surgeons (Elk) 394  
leprosy and the physician (Berry) 1603  
manuscript collection (Oak) 1561  
physiological investigation in flying  
safety program of FTAF (Lawton) 937  
1843

### ADENOCARCINOMA

of right fallopian tube with metastases  
to bone marrow, liver, lungs, spleen,  
adrenals and ovaries (CPC) 1632  
of stomach (CPC) 223

### ADRENALS

biological structure of and multifocal  
cortical lesions with disseminated  
hematoma (CPC) 70

### AERO MEDICAL ASSOCIATION

annual meeting notice of 593  
Graybeal Ashton president of Aero  
Medical Association 1229

### AEROSINUSITIS

in submaxillary sinuses 1571

### AEROTITIS MEDIA

in submarine divers 1571

### AIR

pressure measurement in pneumothorax  
469

### AIR FORCE

armored cavalry action on progress in  
235  
Barrett Louis H. vs. Lt. Colonel Air  
Force 51  
child guidance program 1653  
depression on sickle cell anemia  
1177  
Dental Association of officers vs. Lt. Col.  
Rock Air Force Base 603  
epidemic typhus fever at recruit  
training base 802  
flight surgeon on king world-wide rounds  
depicted on oil painting 288  
Flying Train on physiological investigation  
in flying safety 937  
hemorrhagic hemophilia C disease in  
army 577  
hospital dedicated to Whiting Air Base  
in Tripoli, Libya 289  
Legion of Merit awarded to the officer  
1379  
new School of Aviation Medicine ground  
break for 1065  
outstanding Legion of Merit 606  
oral surgery complications caused by  
flight 264  
preparation and dental incidence rate 1363



## ARMY (continued)

a short-term institution and adjustment in military situation 1701  
 aeromedical evaluation 1193  
 calculi ureter management without barbiturates 313  
 children tuberculosis activity among 95  
 DeWitt Army Hospital dedicated 133  
 entomologic illustration service 103  
 Heister, Leonard D. awarded Distinguished Service Medal 1230  
 Ireland Army Hospital dedicated, 866  
 Lt. Ian S. Igeon General visit Army Hospital 754  
 medical officers assigned to psychiatric service 558  
 Medical Service Corps of notes on historical development, 54  
 military delinquency management 1616  
 1745  
 Military Medicine and Allied Sciences Course notes concerning, 499  
 mitral commissurotomy 662  
 mobile dental clinics 893  
 nontuberculous chest disease originally diagnosed as tuberculosis 1761  
 physician's role to recommendations of compass on personnel actions 871  
 preventive medicine course 454  
 professionalism in memory of James S. Stearns 598  
 psychiatric problems in military effect on soldiers 346  
 psychiatric problems in installations in Europe 554  
 psychics who commit offenses punishable by court martial 243  
 St. John Clement F. commends officer at Landsstuhl Army Medical Center 594  
 Schistosoma mansoni in Puerto Rico 1093  
 shipment of medical books to Korea discontinued 758  
 special care ward for critically ill surgical patients 1258  
 tests for assessment of intellectual deficit 883  
 Thompson, Will M. L. receives Special Award of Honor American College of Radiology 600  
 tuberculostipulation of military aircraft treatment 1814  
 tuberculosis treatment in military hospital 963  
 tuberculosis trends in management of 14  
 USAREUR Medical Surgical Co. receives Army Hospital 754

## ARMY (continued)

ventilators in aid, procurement of in Japan 406  
 ARRYTHMIA. See Atrial Fibrillation  
 ARTERIES. See also Aorta  
 coronary insufficiency andtherosclerosis (CPC) 693  
 gastroploic penetration of and gastric ulcer of prepyloric area (CPC) 693  
 renal traumatic occurrence of 573  
 ARTERIOSCLEROSIS  
 and coronary insufficiency (CPC) 693  
 ASTROCYTOMA  
 of meningocephalon with obstruction of aqueduct of Sylvius (CPC) 693  
 ATELECTASIS. See Lung collapse  
 ATHEROSCLEROSIS. See Arteriosclerosis  
 ATRIAL FIBRILLATION  
 transient, in normal hearts 1  
 ATRIAL SEPTAL DEFECT  
 hyperthermia as a result of closure of 784  
 AVIATION  
 accident rate and eating habits of pilots 942  
 accidents reflections and prevention 1603  
 acclimatization to space flight, 1563  
 atherosclerotic pathologic condition of 704  
 blackout from acceleration forces aviation with resistance to 725  
 collection of aorta with created resistance to blacking-out effect of acceleration 725  
 decompression on the skin's medium in time 1366  
 flight doctor's participation in Marine Corps activities on 1017  
 flying safety program physiologic in investigation 937  
 hazards in routine flight of pacifist 2564  
 homozygous hemoglobin C disease in 577  
 hyperventilation in aviators 937  
 hypoglycemia in aviators 940  
 medicine Royal Air Force officer commended for achievements in 762  
 military medical facilities visited by Canadians 922  
 Navy aviation selection tests 1018  
 new School of Aviation Medicine ground broken for 1065  
 oral surgery complications in 264  
 parachuting and dental incident time 1363  
 physiologic investigations in flying safety program of Flying Training Air Force 937





## RAIN

- abscesses of and candida mycetozoa (CPC) 1801  
 trocytoma of mesencephalon with obstruction of aqueduct of Sylvius (CPC) 908  
 epidural hemorrhage secondary to encephalography (CPC) 544  
 epidural intracranial abscess complicated by other intracranial infection 120  
 hemorrhage into cerebral (CPC) 693  
 lesions of with disseminated histoplasmosis and bilateral aural destruction (CPC) 0  
 meningomycocele cerebri (CPC) 1476  
 polynephaly 1057  
**RAMLITT CHARLES II**  
 appointed Secretary of Military Medicine  
 Section Scientific Assembly A M, A 1232

## REAST

- corticoma of 1152  
**REATH** breathing See Respiration  
**ROMSULPHALEIN** See Sulfobomophthalin Sodium  
**RONCHIECTASIS**  
 in Kartagener syndrome 279  
 multidrug resistant tuberculosis 1269

## RONCHITIS

- non-tuberculous chest cases 1274

## ROXTON, SHELDON S

- addressed to Board of General 1542

## RUCKER, WILBUR M.

- presenting diagnosis shed Section Medical  
 to Commanding General of Walter  
 Reed 1230

## URNEY, LEROY E

- presenting diagnosis of Military  
 Section 1837

## URNS

- aeruginous globulin 321

## ALCANEUS (scale)

- cysta of 1102

## ALCIFICATION

- of procreant placentaotomy for  
 chronic procreantitis and 1037  
 pulmonary cause determined in  
 non-tuberculous diseases 1261

## ALCIUM HYDROXIDE

- polyphosphoric acid etch 979

## ALCULI

- terminal nodule without hazardous  
 tumor 313

## ANCER

- brochiolitis (alveolar cells) of left  
 lower lobe (CPC) 1171  
 of breast 1152  
 of esophagus 1317

## CANDIDA

- mycetozoa with multiple renal  
 cerebral and myocardial abscesses  
 (CPC) 1801

## CARBON DIOXIDE

- compresses for treating cervical esophagus,  
 587

## CARCINOMA See Cancer

## CARDITIS See Heart inflammation

## CAROID See Papin

## CEREBRUM See Brain

## CESAREAN SECTION

- perforation mortality associated with  
 1780  
 rupture of previous cesarean subsequent  
 pregnancies 1323

## CHEST See Thorax

## CHILDREN See Infants

- artificial respiration in 851  
 congenital cardiac defect artificial  
 bubble oxygenator in pair of 658  
 guidance program in Air Force hospital  
 1653

- leukoplakia granulomatous in 2-year-old boy  
 with history of eating dirt 1022  
 tuberculosis statistics among 957

## CHLORPROPAMINE (Thorazine)

- effect of jaundice 365  
 control of histamineergic acid forma-  
 tion 1249  
 toxic effect of 370

## CHONDROSARCOMA

- of hip binding after amputation of  
 1517

## CINEPLASTY

- technique of follow-up patient 972

## CIRCUMCISION

- in polyphosphoric acid (polyphosphate)  
 764

## CIRRIOSIS

- of liver due to hemochromatosis (CPC)  
 222

- secondary to congenital atresia of  
 common hepatic duct (CPC) 1350

## CLASSIFIED INFORMATION

- and mental illness 1007

## CLIMATE

- and human water requirements 1121  
 (circulation) 1697

## CLINICOPATHOLOGIC CONFERENCE

- 70 222 381 544 693 855 998 1171  
 1350 1476 1632 1801

## COCCIDIOIDOMYCOSIS

- multidrug resistant tuberculosis 1269

COELENTERATES, See Jellyfish Sea  
 Anemones See Worms

## COLON

- sigmoid redundancy of 1303  
 sigmoid anastomosis bilobed substitute  
 1311



## DENTISTRY (Continued)

- microradiography of bone and teeth 991  
 model of 893  
 oral bony defects, use of anorganic & heterogenous bone in, 789  
 oral surgery complications & used by Night 764  
 panoramic x-ray machine & parachuting and dental treatment rate 1163  
 phonograph records and teaching 1844  
 preventive dentistry in Air Force 708  
 provision for in Dependents Medical Care Act 89  
 pulp therapy in adult teeth with calcium hydroxide 979  
 speeds increasing 1791 (correspondence) 1846  
 Symposiums See Meetings  
 teeth, personal dentifrice by 300  
 temperature of tooth and those developed in rotating dental instruments 1293 (correspondence) 1846  
 wrist rest and force 1797 (correspondence) 1846

## DEPARTMENT OF DEFENSE

- Armed Forces Institute of Pathology work being done by (correspondence) 1698  
 Dependents Medical Care Act 82  
 Royal Air Force officer commended for civility and aviation medicine by 62

## DEPENDENTS MEDICAL CARE ACT (Statutes of 82)

- **TESTOSTERONE CYCLOPENTYL** 1147E. See Testosterone  
 — **ylc** pentylpropionate

## DERMATITIS. See Also Eczema

- atopic 1138  
 due to benzalkonium chloride contact 116  
 lba red dye 443  
 eczematous contact cross sensitization 438  
 seborrheic 1139  
 stasis 1141

## DERMATOSIS. See Skin disease

## DE WITT WALLACE

- hospital named in honor of 1375

## DIABETES

- mellitus and anterior pituitary insufficiency 730

## DIRT

- fungus and viral granuloma toxis 1022

## DISASTER

- survival time and water requirements 1125 (correspondence) 1697

## DISLOCATION

- sternoclavicular of clavicle due to trauma 1799  
 of foot due to trauma 1711

## DOGS

- first as an induced gastric acid response in 145  
 injection for replacing segments of abdominal and thoracic aorta in, 1452

## DRUNKENNESS. See Alcoholism

## DUBIN-JOHNSON SYNDROME

- case 362

## DUODENUM

- ulcer of roentgenographic findings in 646

## EAR

- Aerostatus of middle ear and its relationship to submarine warfare 1571  
 anatomical study of and injury of 1571

## EATING HABITS

- of pilots and accident rate 942

## EBERSOLE, JOHN H.

- medical officer U. S. S. Seewolf 1694

## ECZEMA

- topical 1138  
 chronic eczematous dermatitis 1141  
 clinical signs 1137  
 annular 1140  
 subacute and chronic 1139

## EDEMA

- acute pulmonary during intermittent posture pressure breathing 1027

## ELECTROLYTOGRAPHY

- and myelography comparison of 839  
 value of electrolytic 831

## ELECTROPHORESIS

- in diagnosis of homozygous hemoglobin C disease 1177  
 in diagnosis of sickle cell hemoglobin C disease 109

## ELLIS-VAN CREVELD SYNDROME

- analogous cases 1527  
 thoughts of 1527

## FEBOLISM

- fatty and fatty liver 114  
 pulmonary with infarction 1275

## EMERGENCY

- management of national economy course in 846

## EMPHYSEMA

- pulmonary 1275  
 physiological relation of disability to hypoxemia and congestive failure in 1577

## ENEMA

- control of enzyme for impact on of feces 1131

- LEISHA (Continued)**  
 Fleet 1461  
 packaged contents in pipe area 1461  
 protozoanoidness 1461
- ENTOMOLOGY**  
 illustration service 103
- EXURESIS**  
 and *Amia bilida occulta* 40
- ENZYMES**  
 in enema for impacted feces 1131
- FOSSIL ORIBIDS**  
 count high in larval granuloma 102\*
- EPIDEMIOLOGY** See in Determination of disease  
 Asian influenza on U. S. S. Vale 1717  
 rheumatic fever problems in 80\*
- EPIDIDYMITIS**  
 nonspecific in military service 641
- EQUIPMENT**  
 filter membrane for potable water 1495  
 overhead acoustic panel for piped gases vacuum and electric outlet 1430  
 potable water tanks on submarines 179\*
- RAY SAFETY STANDARDS** in use of 1334
- ERUPTIONS**  
 caused by Dimethylsulphate 1314
- ERYTHROCYTES**  
 preserved in Rh antibody testing 173
- ESOPHAGUS**  
 carcinoma of 1317  
 cervical rupture of by compressed carbon dioxide 387
- EUROPEAN CONGRESS OF AVIATION MEDICINE**  
 to be held in Seden 764
- EVACUATION**  
 aeromedical (Army) 1193  
 aeromedical progress in 235
- FEARS ANTOINETTE M. K.**  
 awarded Legion of Merit 606
- FECES**  
 impacted enema containing enzyme for 1131
- FEET** See Foot
- FEMUR**  
 fractures of 825  
 intramedullary nailing in fracture of 826  
 skeletal traction in fracture of 827
- FETUS** See also Infants newborn  
 transverse presentation of 847
- FEVER**  
 Rheumatic See Rheumatic Fever
- FOREIGN BODIES**  
 metallic in marble for 59 years 1222
- FORSCE JAMES C.**  
 promoted to Brig. Gen. 154\*
- FRACURES**  
 following corticosteroid therapy 907  
 in postmenopausal women 11  
 corticosteroid therapy 911  
 of femoral shaft 825  
 trauma 1110  
 rhage in  
 os calcis 1114
- FUNGI** See also specific fungus infection  
 as *Coccidioidomycosis* *Histoplasmosis*  
*Mucormycosis* *Tinea*  
*Candida mycetozemias* (CPC) 1801  
 infections of hair 1144  
 infections of skin 1142  
 ringworm 1142
- FURACIN** See Nitrofurazone
- FURADANTIN** See Nitrofurantoin
- GALLBLADDER**  
 biliary manometry of 481
- GAMMA GLOBULIN** See Globulin
- GANGLIONEUROMA**  
 case 1676
- GAS**  
 nerve poisoning 495  
 nerve use of Batrow neuromuscular stimulator for inducing respiration in animals poisoned with 1726

## GASTROINTESTINAL

- errors in alimentary absorption  
 nitrogen<sup>13</sup> in evaluation of 668  
 enteric pathogens among Eskimos  
 at Barrow Alaska 534  
 precancerous in procurement of vegetables  
 to avoid infections of 406

## GENITOURINARY SYSTEM

- tuberculosis of 945

## GLOBULIN

- serum gamma in burned patients 31  
 serum gamma levels effect of  
 aperticemia on 321

## GONADOTROPIN

- chronic human and release of  
 spermatzo from male *Rana pipiens*  
 1160 1169

## GRAFTS

- abdominal and thoracic aortic anastomosis  
 sponge in dogs 1452  
 autogenic bone in oral bony defects  
 789

## GRANULOMATOSIS

- larval diagnosed by needle biopsy  
 of liver 1022

## GRAYBIEL ASHTON

- president of Aero Medical Association  
 1229

## GREEN GEORGE B

- chairman of Fatigue Loss Commission  
 Association of Military Surgeons 1836

## GRIFFIN HERSCHIEL E.

- speaker at conference on streptococcal  
 infection 1842

## HAIR

- fungus infection 1144

## HALBOUTY MANAH R.

- awarded Legion of Merit 1379

## HARTFORD THOMAS J.

- promoted to Brigadier General 1542

## HARVEY E. BRUCE

- commended for achievement in  
 aviation medicine 762

## HAYS SILAS B.

- appointed Chairman of Military Medicine  
 Section Scientific Assembly A. M. A.  
 1231

- at dedication of DeWitt Army Hospital  
 1375

- at dedication of Ireland Army Hospital  
 866

- on panel at annual meeting of Military  
 Surgeons 1837

- presented medal and diploma of honorary  
 membership in Brazilian Academy  
 of Military Medicine 1695

## HEART

- atrial septal defect hypothesis in  
 closure of 784

## HEART (Continued)

- congestive failure in cat pulmonary  
 and arterial hypoxemia 1577

- coronary insufficiency and athero-  
 sclerosis (CPC) 693

- coronary insufficiency simulated by  
 histamine 477

- disease simulated by histamine 477

- infarction See Myocardium

- inflammation rheumatic carditis  
 cortisone for 1405

- intracardiac surgery using artificial  
 oxygenator 656

- mitral commissurotomy 662

- normal transient atrial fibrillation  
 in 1

## HEATON LEONARD D.

- awarded Distinguished Service Medal  
 1230

- presented medal and diploma of hono-  
 rary membership in Brazilian Academy  
 of Military Medicine 1695

## HEMANGIOMA

- of cervical spine, medulla and pons  
 (CPC) 544

## HEMOCHROMATOSIS

- idiopathic (CPC) 222

## HEMOGLOBIN

- carbon monoxide hemoglobin to  
 militarily 577

- in sickle cell disease with plenic  
 infarction following high altitude  
 ascent 109

## HEMORRHAGE

- peritoneal secondary to cephelography  
 (CPC) 544

- in toxic effects of cyanide 1114

- in cerebral (CPC) 693

- in subarachnoid cerebral and cerebral  
 due to platelet deficiency (CPC)  
 222

## HERNIA

- histamine stimulating aortic heart dis-  
 ease 477

- in guinea pig technique of cremaster muscle  
 dissection in preparation of 56

- in histamine delayed obstruction  
 first stage repair 745

## HERNIOPLASTY

- inguinal technique of testicular scrotal  
 dissection in 56

## HIP

- histamine after amputation for chondrosarcoma  
 of 1517

## HISTAMINE

- induced gastric acid response in dogs  
 1249

## HISTIOCYTOSIS X

- case (CPC) 381

## HISTOLOGICAL

disseminated with bilateral renal  
destruction and multiple calcified  
lesions (CPC) 77  
pulmonary 173 174

## HISTORICAL ITEM

Alams Samuel Rev 13 2 41 5  
autograph and artist 675  
HOCAI PARTHOMIOTIS  
at dedication of Air Force 121 1  
Libya 767  
Member of Committee on Status of  
National Defense visits Europe and  
Middle East 132  
on panel at annual meeting of  
Surgeons 1837  
receives French Medal of Honor 4  
receives Georgetown University  
Medal 756  
visits U. S. S. Seawolf 1074

HYPERTENSIO See Blood Pressure

## HYPEROTOXIN

In venom of coelenterates 1579

HYPOGLYCEMIA See Blood Sugar

## HYPOTHIRIA

atrial septal defects closed with aid of  
784

## HYPOXEMIA

arterial correlation with degree of  
disability and congestive failure in  
pulmonary emphysema 1577

## HYSTERIA

conversion and military assignment  
1086

## ICARUS

and the physician (Lecture) 1603

ICTERUS See Jaundice

## IDENTIFICATION

personal by teeth 500

ILEUS See Intestines obstruction

## INFANTS

artificial respiration in 851  
colon sigmoid redundancy of 1303  
congenital dermal sinus of posterior  
lossae 1765  
delayed obstruction after first stage  
repair of omphalocele 745  
duplication of small intestine as cause  
of neonatal intestinal obstruction  
1829  
fetal mortality in rupture of pregnant  
uterus 1324 1327  
histiocytosis (Letterer-Siwe syndrome)  
in (CFC) 381  
intracranial dermal cysts in 1765  
lobar atelectasis with meconium ileus  
in 581

THE AMERICAN

## I. THE AMERICAN

and the behavior in navy 1875

between Mental Hygiene Consultation  
Service command and stockade in  
military delinquency movement  
1616 1745

daily community meetings in psychiatric  
ward 1339

father-son relationship as factor in  
psychiatric discharges of midshipmen  
423

group meetings on closed ward 811 1337

in large naval general hospital 1658

in therapeutic community 811 1337  
leadership observation and micro  
of 1658

passive-aggressive personality 62

physician's role in recommendations  
of compassionate personnel actions  
871

social psychiatry developments in  
184

INTESTINES See also Colon Gastro-  
intestinal Tract

obstruction meconium ileus with cystic  
pancreatic fibrosis and pulmonary  
complications 581

obstruction neonatal caused by  
duplication of small intestine 1829

## INTOXICATION

ethyl alcohol fatal with fatty liver and  
fat embolism 114

## IODINE

radioactive (iodine 131) and olefin in  
evaluation of pancreatic exocrine  
function or alimentary absorption 668

**IRELAND MERRITTE WEBER**

hospital named in honor of 866

**IRRADIATION**

cobalt therapy unit at Naval Medical Center 1071

reduction of ionizing radiation in diagnostic roentgenology 1467

**ISOTOPIES**

radioiodine (iodine 131) and olefin in excretion of pancreatic exocrine function and intestinal absorption 668

**IVALON**

surgical device for replacing vascular segments 1452

**JACOBS ELGENE C.**

wins S. Henry Wellcome Medal and Prize 134

**JAPAN**

American Society of Radiology sponsors 1st conference 134

**JAUNDICE**

chlorpromazine-induced 365

familial nonhemolytic 368

in constitutional hepatic dysfunction 368

in Dublin-Johnson syndrome 362

**JELLYFISH**

death of child due to ataxia 1597

ating and the medical management 1587

**JOBE EUGENE V**

Fundamental presented to by Association of Military Surgeons 135

**JOHNS VARNER J. JR.**

visiting hospital at Fort Benning Ga 1843

**JOHNSON S. E. and J. D. R. M. S. and S. F. C. J. O.**

Typhoid syndrome 125

**JONES WALTON L.**

Fundamental Medal presented to by Association of Military Surgeons 135

**KARTAGENER'S SYNDROME**

case report 279

**KENORICK DOUGLAS B.**

appointed Representative to Scientific Section of Military Medicine Section Scientific Assembly A. M. A. 1232

**KENNEY EDWARD C.**

at dedication of cobalt radiation therapy unit 1071

selected for Retiree Award 1542

**KIONEY**

bilateral cutaneous ureterostomy in impaired function of 1311

translumbar severance of renal artery 573

tuberculosis of 947

**KILDAY PAUL J.**

at ground breaking for new School of Aviation Medicine 1066

**KOONTZ AMOS R.**

annual meeting of Military Surgeons held under presidency of 1836

**LABOR**

acute puerperal inversion of uterus 913

presentation transverse 847

**LARVA MIGRANS visceral**

See Granulomatosis larvis

**LEADERSHIP**

observation on dynamical 1658

**LECTURE**

See Address

**LEECHMAN CHARLES L.**

appointed Delegate of Military Medicine Section Scientific Assembly A. M. A. 1232

**LETTERER-SIWE SYNDROME**

case (CPC) 381

**LETTERS TO THE EDITOR**

See Correspondence

**LEUKEMIA**

radiation and 1331

**LEUKOPLAKIA**

and lichen planus differential diagnosis and treatment 198

**LICHEN PLANUS**

and leukoplakia differential diagnosis and treatment 198

**LIDOCAINE HYDROCHLORIDE**

fatal anaphylactic reaction to 740

in pilot sinus 513

**LIMBS ARTIFICIAL**

neoplastic arms 972

**LINDAU-VON HIPPEL SYNDROME**

case (CPC) 544

**LIVER**

biopsy in larval granulomatosis 1022

cirrhosis of duodenal mucromatosis (CPC) 222

cirrhosis secondary to congenital atresia of common hepatic duct (CPC) 1550

degeneration fatty of (CPC) 1801

fat embolism 114

function tests in Dublin-Johnson syndrome 362

function tests in constitutional hepatic dysfunction 369

acetic acid exhibit awarded Certificate of Merit at A. M. A. meeting 1228

**LUNGS**

abscess 1275

cured malnutrition during intermittent positive pressure breathing 1027

embolic abscess of 901

carcinoma bronchiolar (alveolar cell) of (CPC) 1171

## LUNG (Continued)

11

- coccidioid mycosis as cause of cavitory lesions 179
- collapse (lobar) in infant with pneumonia and cystic pancreatic fibrosis 581
- erythema 123
- erythema chronic cutaneous  
correlation between degree of disability and arterial hypoxemia 157
- histiocytosis 1763 1769
- metastases to both lungs pleura diaphragm pericardium hilum and aorta (C.C.) 1171
- neoplasm primary 173
- pneumonia as cause of lesions 177
- pneumony uncomplicated followed by bilateral lobectomy 1707
- sarcoidosis 1277
- Tuberculosis See Tuberculosis
- LYMPHATIC SYSTEM
- inferior deep cervical lymph node biopsy 1731

## MALARIA

- vivax without primary attack in Korean veterans 427

## MANDIBLE

- actinomycosis of 1214
- metallic foreign body in for 50 years 1222

## MARINE CORPS

- recruits rifle-sling palsy in 1167

## MARINE LIFE See also Coral Fish

- Jellyfish Portuguese Man-of-War Sea  
Pettle Sea Wasp

- Amphioxus dangerous to man 1590

- Coelenterates especially dangerous to man 1588

- Hydrozoans dangerous to man 1588

- Scyphozoans dangerous to man 1589

## MATTHEW THOMAS W

- promoted to Brigadier General 1843

## McMILLON ALPHONSE

- appointed Vice Chairman of Military  
Medicine Section Scientific Assembly  
A.M.A. 1231

## MECONIUM

- ileus with cystic pancreatic fibrosis  
and pulmonary complications, 581

## MEDICAL OFFICERS

- Adams Samuel Revolutionary Army  
surgeon and dentist 625
- assigned to psychiatric services 558
- Awards See Awards
- Certified by Specialty Boards See  
Specialty Boards
- Deaths See Deaths
- decompression sickness need for  
knowledge of 1366

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

## MEDICAL SERVICE CORPS

- Army Corps in historical development  
of 754

## MEETINGS

- Aero Medical Association notice of  
593
- American College of Surgeons notice  
of 1760
- American Public Health Association  
notice of 1538
- Association of Military Surgeons 154  
974 1381 1836
- conference on streptococcal infections  
held at Fort Carson 17
- daily community meetings in psych  
service 1339
- Fifth Central Japan Dental Conference  
sponsored by American Stomatological  
Society of Japan 1234
- Inter-American Medical Convention  
notice of 253
- International College of Surgeons notice  
of 1380
- Military Medicine Section of A.M.A.  
notice of 759
- Military Medicine Section of A.M.A.  
officers appointed at 1231
- Military Medico-Dental Symposium  
notice of 293 1374
- National Industrial Health Conference  
notice of 601
- Second European Congress of Aviation  
Medicine notice of 764
- Society of Military Ophthalmologists  
and Society of Military Otolaryngologists  
notice of 1134







## NEWS ITEMS (Continued)

- Military Medico-Dental Symposium  
notice of 293 1374
- National Industrial Health Conference  
notice of 601
- Navy Preventive Medicine Unit No. 7  
commissioned in Naples Italy 1073
- New Air Force School of Aviation Medicine  
ground broken for 1065
- oil painting of flight surgeon making  
tombstone presented to General Ogle 288
- phonograph records aid teaching 1844
- preventive medicine conference held at  
Fort Carr on 1842
- preventive medicine course for medical  
officers 454
- Raines G. N. elected president of  
American Board of Psychiatry and  
Neurology 294
- Royal Air Force officer commended for  
achievements in aviation medicine 762
- St. John Clem. at F. commanding officer  
at L. D. Army Medical Center 594
- Second European Congress of Aviation  
Medicine notice of 764
- Secretary General of World Medical  
Association visits Randolph Air Force  
Base 921
- air medicine Corps officer elected for  
general officer and flag rank 1542
- Society of Military Ophthalmologists and  
Society of Military Otolaryngologists  
notice of joint dinner meeting 1134
- Smith, C. T. R. A. F. Army hospital 754
- symposium on military medical problems  
at International College of Surgeons  
Congress 1380
- Thompson William L. receives Special  
Award of Honor American College of  
Radiology 600
- USAREUR Medical Surgical Cooler es-  
tablished at U. S. Army hospital 754
- Wilson Charles E. leader in military  
medicine attending reception for 1069
- NITROFURANTOIN**  
inconspecific prosthesis 822
- NITROFURAZONE**  
inconspecific prosthesis 822
- NUCLEUS PULPOSUS** See Spinal inter-  
vertebral disk
- NUNEMAKER JOHN C.**  
operational annual meeting of Military  
Surgeons 1837

## OBLIGATIONS

- military of obligation (addition) 394

## OBLIGATIONS (Continued)

- of medical profession in use of x-rays  
and other ionizing radiation 358
- OBSTETRICS**  
current postpartum laceration of uterus  
913
- cesarean section and maternal and fetal  
mortality 1780
- transverse presentation of fetus 847
- OFFICE OF DEFENSE MOBILIZATION**  
Director W. P. Limer appointed Assistant  
Director for Health in 1838
- OGLE DAN C.**  
at ground breaking for new School of  
Aviation Medicine 1066
- oil painting of flight surgeon making  
tombstone presented to 288
- on panel at annual meeting of Military  
Surgeons 1837
- presents medal to Robert J. D. Nord 1076
- OMPHALOCELE**  
delayed obstruction after first stage  
operation of 745
- operation of 445
- OVARY**  
abcess of complicating pregnancy 1664
- OXYGENATOR**  
artificial intracardiac surgery 656
- OXYTETRACYCLINE HYDROCHLORIDE**  
in nonspecific prosthesis 822
- PAIN**  
cheat postpartum differential diagnosis  
in case 1509
- effect on performance 332
- in laceration of cutis by neck flexion  
in cervical traction 374
- PALSY** See Paresis
- PANCREAS**  
cystic fibrosis of with meconium  
ileus 381
- radiation fat in the situation of pa-  
ncreatic exocrine function 668
- total pancreaticotomy for chronic  
pancreatic carcinoma and calcification  
of 1037
- PANCREATECTOMY**  
total for chronic relapsing pancreatitis  
and calcification of pancreas  
1037
- PANCREATITIS**  
chronic relapsing and calcification  
of pancreas total pancreatic tectomy  
for 1037
- PAPAIN**  
in enema to improve defecation 1131
- PARACHUTING**  
and dental aide training 1363
- PARALYSIS**  
lateral complicating factors in mono-  
nucleus 1670

## PARALYSIS (Continued)

111-2

first trial of tight harness in military  
pilots 1784  
rattle eye due to rifle sling 1187  
rifle sling 1187

## PARASITIC

treatment 311 (continued over)  
764

## PARASITES

intestinal and subcutaneous 1111 in  
Japan 47  
Schistosoma mansoni in West African  
soldiers 1023

Tenacacanth and larval gastro-  
enteritis in child 1077

## PATTERSON ROBERT A

awarded Legion of Merit 1379

## PEARSON FLAVOR

receives McLeister Award 135

## PE TILLEN

severe allergic reactions to in 4  
patients 578

## PEPTINOGEN

in plasma in duodenal ulcer 795  
in plasma relation of levels to ethnic  
origins 795

## PERFORMANCE

effect of pain on 332  
military assignment and choice of con-  
version symptoms 168  
military psychiatric prediction and  
346 1457  
muscular psychomotor and psycho-  
logic effect of procloperazine on  
1433

PERSONNEL See also Pilots Medical  
Officers Midshipmen Recruits

ambulation individuals and adjust-  
ment in military situation 1201  
identification by means of teeth 500  
in x ray work safety standards for  
1334  
mentally ill and classified information  
1007  
military assignment and choice of con-  
version symptoms 1686  
military delinquent management of  
1616 1745  
passive aggressive personality 62  
Psychiatric Problems See Psychiatry  
return to duty after treatment for tuber-  
culosis 1814  
test pilots attitudes and motivations  
of 718

## PERSONNEL ACTIONS

compassionate role of physicians in  
recommendations of 871  
court martial prisoners disposition of  
399

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

111-2

## POISONING (Continued)

- acet gas 495
- enom jellyfish 1587
- venom weaver 1441
- POOS ROBERT S
- awarded Gorgas Med 1 134
- PORPHCEPHALY
- case 1037
- PORTUGUESE MAN-OF-WAR
- d ng rows to ma 1598
- POWELL WILLIAM H
- awarded Legion of Merit 1379
- PREGNANCY
- acute puerperal inversion of uterus 913
- cesarean section and maternal and fetal mortality 1780
- cesarean section rupture of previous scar 1323
- ovarian abscess complication 1664
- Raapipus in diagnosis of 1160 1169
- transverse presentation of fetus 847
- uncomplicated full wing lobectomy and liulectomy 1507

## PRESSURE

- atmospheric and otitis media and aerisusitis 1571
- intermittent positive pressure breathing in treatment of acute pulmonary edema during 1027

## PREVENTIVE MEDICINE

- allergy program 673
- conference on streptococcal infections at Fort Cress 1842
- course for medical officers 454
- preventive measures in dental hygiene in Army 708
- prophylactic use of intranasal medication for otitis media and aerisusitis in submarine艇内 1571
- radiation hazard and medical x-ray protection 1331
- reactions to prophylactically administered penicillin 528
- reduction of ionizing radiation in diagnostic roentgenology 1467
- unit Navy commission in Naples Italy 1073
- egg tables inspected to prevent gastroenteric infections 406
- water potable on submarines 1792

## PRIAPISM

- of unknown cause 271

## PRISONERS

- and forensic psychiatry 1737
- comparison of voluntary offenders with offenders on project sentence completion test 1825
- courts-martial disposition of 399
- court-martial effect of confinement on 401

## PRISONERS (Continued)

- courts-martial psychiatric study of 397
- PROCLORPERAZINE (Compazine)
- effect on psychologic psychomotor and muscular performance 1433
- PROCTOSIGMOIDOSCOPY
- enema packaged attention in preparation for 1761
- PROSTATOURTHIRITIS
- no gonococcal 820
- non-specific 820
- PROSTHESIS See Limbs Artificial
- PSYCHIATRY
- alcoholism in schizophrenia (correspondence) 604
- anxiety in schizophrenia (correspondence) 604
- authoritarian attitudes and adjustment in military situation 1201
- child guidance program 1653
- closed ward therapeutic group meetings on 811 1339
- combat experience effects of in psychiatric cases 1649
- combat pilots psychiatric screening of 1821
- converts on hysterical choice of military assignment 1686
- courts-martial prisoners psychiatric study of 397
- daily community meetings in psychiatric service 1339
- English hospitals and mental psychiatry 184
- exercise in armed forces 1737
- group meetings on closed ward 811 1339
- hospitalization versus OPD management 557
- hypochondriacal symptoms in schizophrenia (correspondence) 604
- medical officers assigned to psychiatric services 558
- Mental Hygiene Consultation Service and military delinquency management 1616 1745
- mental illness and classified information 1007
- midshipman dynamics in psychiatry discharge of 418
- military delinquent management in stockade 1616 1745
- neuropsychiatric treatment center 91
- personality and personality 62
- physician's role in command functions of compartment personnel actions 871
- psychiatric prediction and military effectiveness 346
- psychiatric prediction of military success or failure 1487



RINGWORM See Trinea

ROBINSON, PAUL L

general chairman, Association of Military Surgeons convention 94  
receives Founder's Medal 1837

ROENTGENOGRAPHY

diagnostic reduction of ionizing radiation, 1467  
duodenal ulcer demonstration of 644  
findings in cysts of osteolysis 1302  
in reduction of sigmoid colon, 1303  
microradiography of bone and teeth 991  
portable microradiography machine 46  
radiation hazards and protection in 1331  
responsibilities of medical profession in use of 358

SAFETY

flying program of Flying Training Air Force 937

ST JOHN, CLEMENT F

new commanding officer at Landstuhl Army Medical Center 594

SALMONELLA

typhimurium in Eskimos at Barrow Alaska 534

SARCOIDOSIS

non-tuberculous chest cases 1272  
treatment with ACTH and cortisone 157  
with extensive fibrosis involving myocardium, lymph nodes, lungs, liver, spleen, bone marrow, kidneys, prostate gland and stomach (CPC) 855

SCALP

ringworm of 1145

SCHISTOSOMIA

cercarial dermatitis for removal of from water 1495  
man on in Puerto Rican soldiers 1093

SCHISTOSOMIASIS

in Puerto Rican soldiers 1093

SCHIZOPHRENIA

early and undiagnosed clinical recognition of (correspondence) 604

SEA ANEMONE

dangerous to man 1591  
thalassidoma in articles of 1599

SEA NETTLE

dangerous to man 1590

SEA WASP

dangerous to man 1589

SEAL, JOHN R

speaker at conference on streptococcal infections 1842

SEDATION

of airborne psychiatric patients 704

SENSITIVITY Sensitivity See Allergy

SEPTICEMIA

effect on serum gamma globulin levels in burned patients 321

SHANNON, JAMES A

on panel at annual meeting of Military Surgeons 1837

SICKLE CELL DISEASE See Hemoglobin

SIGMOID See under Colon

SILLIPHANT, WILLIAM M

spontaneous abortion work done by at Armed Forces Institute of Pathology (correspondence) 1698

SIMMONS, JAMES STEVENS

memorial professorship fund for 598

SINUS

congenital dermal and cyst of posterior fossa, 1765

SINUSITIS

in Kartagener's syndrome 279

SITUS INVERSUS

in Kartagener's syndrome 279

SKIN

Diseases See also Dermatitis Eczema and scabies common 1135

eruption caused by Bromsulphalein 1314

fungus infections of 114

myoblastoma in lip of patient-cell to young adult 1033

virus infections of 1149

SPACE FLIGHT

hazard environmental of 1564

medical and physiological factors in 1563

radiation, cosmic in 1566

stock flight simulator of 1567

SPECIAL-CARE WARD

for critically ill patients and postoperative patients 1258

SPECIALTY BOARDS

Anesthesiology American Board of 453 597 1384

Aviation Medicine American Board of Preventive Medicine 292 597 1384 1540 1697 1841

Dermatology and Syphilology American Board of 291 453 595 1383 1540

Internal Medicine American Board of 291 453 596 757 1077 1235 1383 1540 1841

Neurological Surgery American Board of 453 597 1540

Neurology American Board of Psychiatry and Neurology 595 1383

Obstetrics and Gynecology American Board of 291 596 1383 1540

Occupational Medicine American Board of Preventive Medicine 454 597 1077 1541 (corrected) 1843

Ophthalmology American Board of 453 596 757 1235 1384 1540 1697

Oral Pathology American Board of 757

Oral Surgery American Board of 757 1384

Orthodontics American Board of 1384

**TEACHING** See Training



## TECHNICS

- artificial respiration for infants and small children 851  
 bilateral radiomammography 481  
 cavity preparation by ultrasonic erosors for instrumentation 519  
 cineplasty 972  
 cremaster muscle dissection in inguinal hernioplasty 56  
 kaolin-adsorption for concentrating urinary chorionic gonadotropin 1160 1169  
 microangiography of bone and teeth 991  
 of electromyographic examination 836  
 palpating and fitting teeth with calcium hydroxide 979  
 rapid (presumptive) for differentiating bacterial from viral pharyngitis and tonsillitis 180  
 Rh antibody testing preserved erythrocytes to 173  
 surgical ligation sponge in replacing vascular segments in dogs 1452  
**TEETH** See also Dentistry  
 personal identification by 300  
**TEMPEL CARL W**  
 promoted to Brigadier General 1542  
 winner of Stitt Award 1836  
**TEMPERATURE**  
 body role of water in regulation of 1122 (correction) 1697  
 tooth and thorax developed in rat tag dental instrument 1295 (correction) 1846  
**TERRAMYCIN** See Oxytetracycline Hydrochloride  
**TESTES**  
 ectopic 1046  
 intravertebral metastasizing 1046  
 tumors of in 1046  
**TESTOSTERONE CYCLOPENTYLPROPIONATE**  
 in palliative therapy for breast 1152  
**TESTOSTERONE PROPIONATE**  
 and testosterone cyclopentylpropionate in cancer of breast 1152  
**TESTS**  
 achievement in use of cephalic prostheses 975  
 Authoritarian Personality 1203  
 California F Scale 1203  
 for Herges 673  
 for assessment of intellectual deficit 883  
 Minnesota Multiphasic Personality Inventory improving predictive ability 539  
 Navy's satellite election 1018  
 oleic acid in evaluation of pancreatic function and intestinal absorption 668

## TESTS (Continued)

- possibility of water supplies determination of 13  
 potential intelligence 684  
 radioactive fat for evaluation of pancreatic exocrine function and intestinal absorption 668  
 Rana pipiens in diagnosis of pregnancy 1160 1169  
 spermatozoal motility activity of R. pipiens 1160 1169  
 Sentence Completion to compare attitudes and stress of differentials in male offenders and non-offenders 185  
**THALASSEMIA**  
 in venom of coelenterates 1599  
 obtained from tentacles of Anemonia sulcata 1599  
**THOMPSON WILLIAM L**  
 presented with Spectator Award of Honor American College of Radiology 60  
**THIOZONIUM BROMIDE**  
 prophylactic use in rats and a study 1573  
**THORAX**  
 chest pain Tietze's syndrome in differential diagnosis 125  
 inferior vena caval lymph node biopsy in diagnosis of intrathoracic diseases 1731  
 nontuberculous chest diseases originally diagnosed as tuberculous 1261  
 postpartum chest pain differential diagnosis in case 1509  
**THORAZINE** See Chlorpromazine  
**THROMBOCYTOPENIA**  
 due to hypothyroidism or chemical bone marrow depression (CPC) 222  
**TIETZE'S SYNDROME**  
 differential diagnosis of chest pain 125  
**TINEA**  
 barba 1146  
 capiti 1144  
 corporis 1146  
 cruris 1146  
 pedis 1147  
 vesicis 1143  
**TOES**  
 subungual exostosis 985  
**TONSILLITIS**  
 bacterial and viral method for differentiation 180  
**TOXICOLOGY** See Pharmacology and Therapeutics of Specific Substances  
**TRACTION**  
 cervical importance of flexion and cervical radiculitis 374  
**TRAINING**  
 dental course offered by St. Louis Roca



WILSON CHARLES E  
reception for 1069

ZINTEL HAROLD A  
visits hospital at Fort Benning Ga  
1843

XYLOCAINE See Lidocaine Hydrochloride

## Authors

Abbot Frank A .....	1761	Canter Francis M .....	~
Abramson Daniel J .....	513	Canter Hall G .....	~
Alsbrook Harold A .....	1051	Canty Thomas J .....	~
Anderson James B .....	745	Casa Timothy A .....	~
Anslow Ralph D .....	406	Castagno Joseph .....	~
Aronson Roland S .....	1160	Cherperning Frank W .....	~
Aronstam Elmore M .....	1452	Christ Jacob .....	~
Ariz, Curtis P .....	321	Christensen Milton A .....	~
Avery Margaret A .....	1249	Christianson John F .....	~
Ayres William W .....	1102	Clare Henry E .....	~
Baker Floyd W .....	656	Clark Gale G .....	~
Baker William S Jr -- 913 1323	1780	Class Robert N .....	~
Balakov Bernard .....	321	Clewsoway Richard W .....	~
Ballenger Felix P .....	56	Committee on Toxicology of the	~
Barrett O'Neill Jr .....	1037	Council on Drugs American	~
Beals Lynn S Jr .....	604	Medical Association .....	~
Benitez Roberto E .....	365	Cooke, Lane B Jr .....	~
Benjamin Fred B .....	1433	Cotney James P .....	~
Berg Irving D .....	1658	Cooper Phillip .....	~
Berg Perry .....	31	Craddock Wallis L .....	~
Berry Frank B .....	1603	Craigmile Thomas A .....	~
Berte Stephen J .....	945	Creathull Paul .....	~
Biau David .....	397	Crippen Donald A .....	~
Bleck Eugene E .....	972	Gronin Richard M .....	~
Bonilla Kenneth B .....	1829	Grog Sydney H .....	~
Borski Anthony A .....	573	Grook James W .....	~
Boudreau Raymond W .....	173	Groe Benjamin L Jr -- 374	1
Bowers Warner F .....	1829	Cullison Jack W .....	~
Boyne Philip J .....	89	Dahlgren Arnold W .....	1
Brandon Milan L .....	901	Daitch Martin H .....	~
Brannon Earl W .....	1517	Davila Julio C .....	~
Braswell L Render .....	235	Davis Joseph E .....	~
Brauer Frank J .....	1291	Davis Thomas R A .....	~
Briggs Dennie L 184 811 1339	1658	Delaney Lawrence J .....	~
Briskin Gerald J .....	539	Deutsch David L .....	~
Brod Morton S .....	1222	Dickson George .....	~
Broder Harold M .....	1208	Dodson Claude C .....	~
Bruton Ogden C .....	1022	Dudley Hugh R .....	~
Bulle Peter H .....	1249	Elkin Daniel C .....	~
Burdick Kenneth H .....	528	Ernst Franklin H Jr .....	~
Burke Erwin L .....	1189	Eveland Charles L .....	~
Burke Richard M .....	963	Fackler Melvin A .....	~
Bushard Bruce L .....	1745	Fadell Edward J .....	~
Butler James B .....	1430	Fischer Mercedes .....	~
Byrd Jack E .....	913	Foult Richard .....	~
Cameron Bruce M .....	1102	Fournelle Harold J .....	~
Canter Anne N .....	1201		



Ramona C. V. ....	346	Stanford John W. ....	1846
Ree Robert C. ....	445	Stark Herbert H. ....	985
Reen Bernard M. ....	802	Steats Lina ....	184
Ribble George B. ....	1180	Stennis James W. ....	539
Richardson Jesse F. ....	820	Sullivan Benjamin H. Jr. ....	114
Richardson Warren P. ....	209	Sweeney William M. ....	167 209
Rioux Joseph Berchmans ....	1686	Syner James C. ....	1077 1577
Rivkin Laurence M. ....	656	Szynd Lucian ....	264
Robinson Paul I. ....	82	Tempel Carl W. ....	14 1814
Rome Howard P. ....	354	Terry R. Barratt. ....	1845
Rosner Henry ....	1737	Tesler Arthur N. ....	870
Ross William M. ....	841	Thomas David E. ....	67 784
Rundle Frank L. ....	811 1339	Thomas Paul A. ....	1829
Ruzledge Ben A. ....	219	Thompson Calvin W. ....	214
Ryan Francis J. ....	346	Thompson John Q. ....	157
Salzer John M. ....	656	Tracey John F. ....	1517
Samaha Francis J. ....	708	Trawick Zachary T. ....	507
Sanborn Warren R. ....	1792	Tritea David A. ....	1821
Sanford Shelton P. ....	507	Trueman Harry ....	1358
Santos Manuel ....	481	Tucker Anthony C. ....	346
Schaeffer John H. ....	1845	United Nations Scientific Com-	
Schaler Norbert ....	807	mittee on Effects of Atomic	
Scheer Evan W. ....	581	Radiation ....	358
Scherr Merle S. ....	673	Wagner William J. ....	438
Schillhammer William R. ....	1670	Wales James F. ....	189
Schlang Henry A. ....	725	Warden Horace D. ....	901
Schleef Gerd ....	568	Washington Sam. ....	1653
Schlessa James M. ....	1261	Watkins Dale B. ....	1135
Schlessinger Nathan ....	397	Weber Robert F. ....	1363
Schneek Stuart A. ....	1366	Weiland I. Hyman ....	1358
Schneider Morris D. ....	1160 1169	Tells Robert M. ....	1093
Schulte John H. ....	469	White David C. ....	1 17
Schultz, Richard C. ....	1676	Vier James A. ....	14 963 1261 1814
Schwartz, Benjamin E. ....	271	Wilber Charles G. ....	1121
Sella Saul B. ....	1821	Williams Harold L. ....	833
Shaw Christopher C. ....	62	Williams Robert L. ....	1497
Shiver Charles B. Jr. ....	31	Wilson Neil O. ....	406
Shultz Dale ....	1452	Wilson Theodore H. Jr. ....	1057
Silver David. ....	825	Witwer Russell G. ....	1017
Simpson John W. ....	1311	Wyckoff Robert D. ....	500
Singer Richard G. ....	62	Young Allen A. ....	173
Smith Max L. ....	481	Zanca Peter ....	303
Solomero Donald F. ....	321	Zeller Nicholas H. ....	568
Solomon Marvin N. ....	1698	Zimmerman Isaiah M. ....	487
Spencer Francis M. ....	1761		

